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ABSTRACT

With funds from the International Business Machines (IBM) Corporation, Project SYNERGY was launched in January 1990 to address the problem of students deficient in basic skills entering colleges. Project SYNERGY I focused on reviewing and compiling a list of useful instructional software for basic skills remediation; Project SYNERGY II focused on software implementation; and Project SYNERGY III developed an integrated, adaptive, computerized management system. Twenty-two institutions in the United States and Canada, led by Miami-Dade Community College (MDCC), participated in reviewing and implementing computer software for community college students. The first section of this fourth year progress report summarizes the software review and development process as of April 1, 1995, indicating that 663 reviews of 364 different software packages had been conducted. Part 2 presents observations, syntheses, and case studies concerning software implementation in Project SYNERGY over the last 5 years, while part 3 describes the Project SYNERGY Integrator (PSI), an adaptive management system for software used in the project. Part 4 discusses a 7-year project begun in August 1994 to implement the SYNERGY model in Florida's community colleges, describing the goals and implementation plan. Finally, part 5 describes the need to provide universal access to instruction, specifically for students with disabilities. Appendixes include a cumulative directory of project participants, a list of software attributes and learning objectives, a list of software publishers and reviewed software packages, applications software descriptions, a job description for a software implementation director, a World Wide Web address. (TGI)

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Project SYNERGY

Software Support for Underprepared Students

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Year Four Report

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Project SYNERGY

Software Support
for
Underprepared Students

Year Four Report

May 1995

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Dedication

This report, reflecting the collective work of many faculty, staff and administrators over the last five years, is dedicated to Dr. Robert H. McCabe, District President of Miami-Dade Community College, for his vision, mission and passion in addressing the national issue of underprepared college students. He believes that appropriate institutional support for multi-institutional collaboration, with direct participation of practitioners who are closest to the issue, will result in a viable and valuable solution. Project SYNERGY is a testimony to his belief. Dr. McCabe has announced plans to retire from Miami-Dade Community College in 1995 after thirty years of service to the College, the last fifteen years as President.

Acknowledgments

We gratefully acknowledge the contributions of individuals and institutions to Project SYNERGY. In particular...

The International Business Machines (IBM) Corporation for its awards for Project SYNERGY I and II.

The U.S. Department of Education (Title III) for its award for Project SYNERGY III.

The Florida Department of Education for its award for Project SYNERGY IV.

The League for Innovation in the Community College for nurturing inter-institutional collaboration.

The publishers who have provided their software for review.

The publishers who have made (or are making) their software compatible with Project SYNERGY Integrator.

The staff of IKE (IBM Kiosk for Education) for continuing to post the Project SYNERGY reviews on their electronic database.

The faculty reviewers, question writers, and administrators of participating institutions and of the five campuses of Miami-Dade Community College.

The faculty and administrators who have contributed to the *Year Four Report*.

The faculty and administrators of numerous institutions who have believed in Project SYNERGY and have encouraged us to move forward.

The six campuses (Bakersfield College, CA; Kirkwood Community College, IA; Miami-Dade Community College, FL; Montgomery County Community College, PA; Richland College, TX; University of Tennessee at Martin, TN) which will be serving as the training centers for Project SYNERGY.

The staff of Educational Technologies at M-DCC for their team effort to make it all happen for Project SYNERGY — particularly, Lorne Kotler for organizing and editing this *Year Four Report* and Victor Nwankwo for coordinating its software implementation reports.

Dr. Jon Alexiou, Vice President for Education, and the five Campus Presidents: J. Terence Kelly, North; William M. Stokes, Kendall; Eduardo J. Padron, Wolfson; Tessa M. Pollack, Medical Center; Roy G. Phillips, Homestead, for their support and encouragement.

Dr. Maxwell King, President, Brevard Community College, for spearheading Project SYNERGY IV and Mr. Bill Odom, consultant for coordinating that effort.

Miami-Dade Community College's Board of Trustees for its commitment to and support for Project SYNERGY.

Kamala Anandam
Project Director

Table of Contents

Introduction (Kamala Anandam) 1

Part One: Faculty Development in Evaluating & Creating Curriculum (Lorne Kotler) 3

Software Review 3

Mastery Testing 5

Reading (Don Meagher) 6

Writing (Melinda Prague) 7

Mathematics (Norma Agras) 7

Software Development 8

Part Two: Faculty Development in Implementing Software with Students 9

The Challenge of Evaluating Student Outcomes (Victor Nwankwo) 10

"The Students Themselves...": An Interview (Elaine Ludovici) 13

The SYNERGY Environment at North Campus (Gina Cortes-Suarez) 17

Observations about Course Outcomes... (Marlene Cueto) 19

Project SYNERGY Lab Management at North Campus (Lonnie Pollard) 21

Wolfson Campus SYNERGY Center: Then and Now (Joyce Crawford) 23

Starting Up a SYNERGY Center at Kendall Campus (Rose Anne Roche) 24

The SYNERGY Center at Homestead Campus (Carol Dietrick) 26

MDCC Faculty Case Studies 27

ENC 0020 in the SYNERGY Center

Stephanie Packer (North Campus) 28

Sandra Castillo (Wolfson Campus) 33

Wendy Jo Ward (Wolfson Campus) 35

Judith Schurger (Homestead Campus) 38

ENC 1130 in the SYNERGY Center

Abraham Oseroff (Kendall Campus) 44

Marjorie Sussman (Wolfson Campus) 46

Maria Villar (Wolfson Campus) 48

REA 0002 in the SYNERGY Center

Bob Ashcraft (North Campus) 52

Edward Yeatts (North Campus) 53

Azalee Glenn (Kendall Campus) 58
Fred Wolven (Homestead Campus) 60
ENS Courses in the SYNERGY Center
Sharla Jones (Kendall Campus) 65
Elizabeth Wiegandt (Kendall Campus) 68
MAT 0024 in the SYNERGY Center
Ian Cobham (Homestead Campus) 72
The University of Tennessee at Martin SYNERGY Center (Polly Glover) 77
Gwen Shelton (Reading) 79
Jenna Wright (Writing) 79
Sharon Robertson (Study Skills) 80
Brenda Lackey (Mathematics) 80
Richland College SYNERGY Center (Lolita Gilkes) 85
Katherine Gonnet (Reading) 85
Joe Mosley (Writing) 88
Indian River Community College (Florida) 90
Okaloosa-Walton Community College (Florida) 91
Part Three: Project SYNERGY Integrator 93
Part Four: Project SYNERGY IV - The Florida Model 104
Part Five: The Challenge of Universal Access (Paul Edwards) 107
Conclusion: The Challenge of Institutionalizing Technology (Kamala Anandam) 109

Appendices

Appendix A: Cumulative Directory of Project Participants 113
Appendix B: Software Attributes and Learning Objectives 126
Appendix C: Publishers and Reviewed Software Packages 137
Appendix D: Applications Software Descriptions 154
Appendix E: Job Descriptions for *Software Implementation Director* and *Software Implementation Assistant* 159
Appendix F: World Wide Web 161

Introduction

Kamala Anandam

Project SYNERGY Director
Miami-Dade Community College

Many a time I've said that Project SYNERGY is the right project at the right time for the right reason with the right players who knew at least some of the right answers. It is the right project because it is conceived and carried out as a collaborative endeavor; it is for the right reason because it focuses on a national issue — underprepared college students; and it is with the right players because it involves the faculty who teach the underprepared college students. We chose *synergy* as the name for our project since we believed that the whole is bigger than the sum of the parts. As Stephen R. Covey *(The Seven Habits of Highly Effective People)* has said, "valuing . . . differences is the essence of synergy"; thus, we have endeavored to look at a comprehensive solution and not a consensus solution. The former allows a variety of ways to combine human and technological resources, while the latter would restrict such differences.

When we embarked on Project SYNERGY in 1990, we recognized that a longtime nagging problem would require our concerted effort over a long period of time. Five years later, we can say that we see the light at the end of the tunnel. Each one of the 500+ faculty from thirty-two institutions who participated in the project has helped the project move forward. The section on faculty development through software review/development and question writing reflects the silent contribution of the faculty located across the country. The hundred or so institutions which have closely followed our progress every step of the way have encouraged us to maintain the momentum. IBM, the Federal Government, and the Florida State Government have sustained our efforts through their respective grants.

We recognized early on that technology has a definite role to play in a comprehensive solution to address the issue of underprepared college students; but rather than focus on technology alone, the primary question we chose for our efforts is: "What combination of human and technological resources yields the best results and for which students?" A secondary question more recently added to our efforts is: "How should we intertwine faculty members' personal criteria for their success with their students' and the institution's criteria for students' success as measured by their grades?" I am grateful to Elaine Ludovici for articulating this question in her interview. The section on software implementation represents our more recent efforts toward outcome evaluation at the University of Tennessee at Martin, Richland College, and several colleges in Florida, including Miami-Dade Community College. The signal message emerging from these efforts is to use formative evaluation as an instrument for change and maintain faculty members' internal frame of reference as the focus for replications of the evaluation studies.

A major contribution of Project SYNERGY is to set in motion a paradigm shift for both educators and software publishers. In this paradigm shift, we have stressed the need for educators to change their focus from instruction to learning and to become more sensitive about

the need for accountability; we have also stressed the need for software publishers to shift their focus from management software to learning software and to expand their efforts to go beyond drill-and-practice software. The tool that allows and facilitates this paradigm shift to take root is Project SYNERGY Integrator (PSI), an adaptive instructional/learning management system for LAN's (Local Area Networks) developed by Miami-Dade Community College. While separating the management function from instruction/learning, we have included an entirely open architecture in PSI and have provided the publishers (commercial and non-commercial) with the requirements to interface with PSI. Approximately 400 faculty have provided their input for the design of PSI relative to the interface with faculty (PSI Command Module-PCM) and with students (PSI Access Module-PAM). The section on Project SYNERGY Integrator describes PSI and gives the timeline for its release. We are grateful to the following institutions for their willingness to serve as PSI Training Centers: Bakersfield Community College, CA; Richland College, TX; University of Tennessee at Martin, TN; Kirkwood Community College, IA; Montgomery Community College, PA; and Miami-Dade Community College (North Campus), FL.

Although we have concentrated on programs for underprepared college students (reading, writing, mathematics, ESL, study skills/critical thinking), PSI can be adapted for other disciplines as well. We invite interested parties, institutions, organizations, and software publishers to undertake PSI adaptation for other disciplines and commit ourselves to help them in the process.

Part One: Faculty Development in Evaluating & Creating Curriculum

Lorne Kotler

Project SYNERGY
Faculty Participation Coordinator
Miami-Dade Community College

Since the inception of Project SYNERGY in 1990, faculty participants have been directly involved in reviewing instructional software in reading, writing, mathematics, ESL, and study skills/critical thinking; producing mastery questions to test students' competency in the 500+ learning objectives in reading, writing, and mathematics; and more recently, designing illustrative instructional modules in mathematics and whole language. Together these activities have contributed enormously to the content side of Project SYNERGY's efforts to help underprepared college students improve. The activities have also had the increasingly tangible benefit of promoting faculty development, thereby expanding teachers' capabilities for using technological resources in student remediation.

Software Review

As we have reported before, the process of reviewing instructional (and some diagnostic testing) software in Project SYNERGY has been highly systematic, with an emphasis on locating packages that are currently implemented in an educational setting. Each on-line software review collects information about hardware requirements, learning objectives (see Appendix B) covered satisfactorily, instructional modes, and operational reliability and format (see software attributes in Appendix B); it also solicits open-ended commentary and insights. While the emphasis in this process has been on the judgment of faculty as content experts, student input has been encouraged whenever possible. For the software that is becoming compatible with Project SYNERGY Integrator (PSI), we will be able to collect effectiveness data that show PSI users which lessons are working in which ways with which students and that inform publishers of areas where modifications would be appropriate.

As of April 1, 1995, there were a total of 663 reviews of 364 software packages in Project SYNERGY's database. Let it be noted right away that none of these packages are claimed to be *ideal*; rather, they are said to have some useful applications and some satisfactorily implemented learning objectives and software attributes. As such, they have provided us with a starting base of instructional modules for underprepared students, and they will enable

Theresa O'Connell
Software Reviews
Database Manager

us to guide publishers toward the areas where further instructional development is needed.

In previous reports, we included tables that synthesized the Project SYNERGY software reviewers' evaluations of individual packages (up to three reviews per package). Because the tables have become voluminous, we are no longer including them. We urge readers to consult either Project SYNERGY Software Selector (PS^3) or the IBM Kiosk for Education (IKE) for a cumulative listing of review information. See Appendix C for a list of publishers and their software titles we have reviewed.

PS (Project SYNERGY Software Selector)

PS^3 is a software program that helps faculty match up their individualized instructional needs with titles of IBM and IBM-compatible basic-skills software packages reviewed in Project SYNERGY. The latest version of PS^3 includes titles of nearly 350 software packages in reading, writing, mathematics, ESL, and study skills/critical thinking. PS^3 is updated annually.

Using the faculty-developed Project SYNERGY learning objectives for each discipline, as well as the software attributes common to all disciplines, PS^3 searches the database to determine which software titles match the objectives and attributes selected by the user (see Appendix B for a complete list of objectives and attributes). With a series of pulldown menus, the user first sets the **criteria** for PS^3 to use to search the database.

Under **User Preference**, the user specifies the following criteria:

- *Discipline* - Reading, Writing, Mathematics, ESL, Study Skills/Critical Thinking.
- *Level of Content Matching* - Whole Program, Topics/Subtopics, Individual Objectives.
- *Computer Environment* - Networked, Stand-alone, Either.
- *Instructional Mode* - Drill & Practice, Tutorial, Simulation, Game, Comprehensive or Partial Tool.
- *Minimum Acceptable Objectives Score* - Percentage score for objectives "Implemented Satisfactorily."
- *Minimum Acceptable Attributes Score* - Percentage score for objectives "Implemented Satisfactorily."

Under **Topics and Objectives**, the user specifies which topics/subtopics or individual objectives PS^3 should search for in selecting software titles. Under **Attributes**, the user specifies the weight — on a scale of 0-10 — to give to each of the software attributes. The user may also choose to use the default weights, which represent the average of all faculty reviewers who responded that groups of attributes "Should Be Present."

After the search criteria have been specified, the user may instruct PS^3 to search the database. PS^3 will then display a list, ranked by percentage score for the objectives implemented satisfactorily, of the software titles that meet the user's criteria. PS^3 can also search the titles in the database for a match on one or more keywords. The user may elect to see the complete review information for any software title by clicking on it. That information will include the following:

- *Software*: Title, Author, Version, Operating Environment.
- *Publisher*: Name, Address, Telephone Number(s).
- *Reviewer(s)* (up to three): Name, Address.
- *Objectives*: For each objective, the number of reviewers who said the objective is "Implemented Satisfactorily" and the number who said it is not.

- *Attributes*: For each attribute, the number of reviewers who said the attribute "Actually Is Present" and the number who said it is not.

PS^3 can print the list of matched software, the complete review information on any selected software title, and a complete list of information on the software publishers.

Miami-Dade Community College now markets PS^3 on a national scale. For information or a brochure, call or write to:

Miami-Dade Community College
Product Development & Distribution
11011 SW 104 St. • Miami, FL 33176-3393
(305) 237-2158 • Fax: (305) 237-2928

IKE (IBM Kiosk for Education)

Developed and operated by the University of Washington and funded by IBM, IKE is accessible via WWW (World Wide Web) and gopher. You can investigate IKE at one of the following addresses:

- via www to:
  http://ike.engr.washington.edu/ike.html
- via gopher to:
  ike.engr.washington.edu

You can reach the IKE office by e-mail at ike@ike.engr.washington.edu or by telephone (8:00 am - 4:30 p.m., Pacific Time) at (206) 543-5604.

Once you have access to IKE and wish to view the Project SYNERGY software reviews, select **Higher Ed software** at IKE's main menu. Then click on **Higher Ed software reviews**. The reviews for all disciplines will appear alphabetically in a single list. Click on any title to browse the review information, which will include title; discipline; review date; number of reviews (up to three); for each review, a brief summary of content, date of the review, reviewer name and address, and a brief commentary; for all the reviews, a synthesis of topics and objectives covered satisfactorily, instructional modes used, software attributes implemented satisfactorily, hardware required, and publisher or distributor.

Grassroots Response

As we have noted before, faculty believe that reviewing instructional software for Project SYNERGY has been significant in their professional development for several reasons: they have learned to evaluate software (and, by direct inference, teaching and learning with technology) more systematically; they understand better the potentials for using software with their students; and their stature within the institution as developmental educators has been enhanced.

Mastery Testing

Faculty teams in reading, writing, and mathematics have been writing questions for Project SYNERGY Testbank and reviewing them for quality and validity. Additionally, the reading faculty have been selecting and creating reading passages upon which some comprehension questions are based, while the writing faculty have been developing writing topics in place of creating questions for learning objectives that do not lend themselves to multiple-choice testing. At the start of this activity in 1992, the project team prepared and distributed an extensive set of guidelines and sample questions for question writers/reviewers to follow.

Three Discipline Coordinators at Miami-Dade (for reading, Don Meagher; for writing, Melinda Prague; for mathematics, Norma Agras) have been responsible for helping faculty authors to reserve objectives for which to write questions, sending the completed items

out to other question writers for review, and ultimately accepting (or rejecting) the questions for Project SYNERGY Testbank. I have been responsible for getting the questions and items entered into **BANQUE**, the computerized testbank system that will generate mastery tests under PSI.

As of April 1, 1995, we are two-thirds of the way toward having a minimum of ten questions per objective (for a total across the three disciplines of more than 5,000 items). Questions are classified in the Testbank according to **Difficulty Level** (low college prep, high college prep, college level) and **Thinking Skill** (factual, comprehension, application). To manage the process of reserving, writing, reviewing (twice, if necessary), and accepting items, Ed Eisel of the project team developed a special computerized tracking program for the Discipline Coordinators to use in their offices; entering of the items into the actual Testbank is done at the project team's office. Question reliability will be verified in the Project SYNERGY Training Centers.

Syma Wyman
Testbank
Database Manager

Here are some observations made by the Discipline Coordinators about the process of writing and reviewing questions for the PSI Testbank. Their comments highlight faculty development.

Reading

Don Meagher

Over the last two years, I have enjoyed communicating with a number of colleagues from around the country and working with them on the writing of testbank questions for reading. I have appreciated the time and effort many people have put into organizing their expertise into questions that they feel adequately address some of the reading skills important for students to master. Each writer seems to have certain reading skills that he or she feels a special affinity for and wants to formulate into questions — some like vocabulary and word recognition, some like the comprehension skills involved in identifying main points and organizational patterns, while a few prefer the critical-thinking skills involved in analysis and interpretation of passages. It has been a pleasure working with these writers.

Personally, I have learned a great deal about question writing and about writing in general from my involvement with this project. Writing questions for students involves such attention to word choice, clarity of expression, organization, and appearance that I have been forced not only to scrutinize the questions and passages written by the many writers who have participated in this project, but also to carefully consider these elements in my own written communication. I think I have become much more aware of the importance of clarity and precision in my writing to the question writers and the Project SYNERGY staff, as well as to my own students in the course materials and syllabi I prepare for them each semester.

Thus, the writing, evaluating, and editing of questions and answer choices that this project has required and the contacts I have had with colleagues from around the country have been valuable experiences for me, both professionally and personally.

Writing

Melinda Prague

As a coordinator of question writing for Project SYNERGY, it has been my responsibility to assist faculty in reserving objectives for which to write questions. Those questions are then sent to faculty for review and ultimately accepted for inclusion in the Project SYNERGY Testbank.

One of the most enjoyable aspects of working as a coordinator has been my interaction with faculty as close as the North Campus of MDCC to as far away as Bakersfield College in California. It has been exciting to work with faculty who are contributing to making Project SYNERGY a success. We share a common belief that our students will benefit from the integration of teaching and technology that Project SYNERGY provides.

I have been impressed by the quality and diversity of questions I have received. As the project continues and we get closer to our goal of ten questions per objective, I feel certain that it will be faculty and students who will benefit from Project SYNERGY, which promises to provide the best of technology while keeping that all-important human touch.

Mathematics

Norma Agras

Recently looking through the list of mathematics objectives, I noticed that as I sought more questions for one of the writers, it became increasingly difficult to find questions from that writer's "wish list." This, of course, meant one thing: our Project SYNERGY Testbank was nearing its completion. I accepted this fact with mixed emotions.

I have been the Discipline Coordinator for the mathematics portion of the Testbank since its onset. Initially, I expressed a great deal of skepticism about the very purpose of the project. Was technology really the answer to dealing with our enormous problem of teaching underprepared students? I was unsure. Nevertheless, after several meetings with Lorne Kotler and the other coordinators, my job was underway.

Writing guidelines was my first major task. Once those were completed and sent to the writers, the coordinating began. It was slow at first. I was often communicating with my writers on the telephone or by mail, inquiring about their progress, clarifying some objectives, and so on. Questions came trickling in. I logged them, read them, sometimes edited them, and sent them to reviewers. As time went on, some writers became more and more proficient at their task. The quality of the questions, in my opinion, improved.

The greatest joy for me has been the opportunity to work with so many different people from such a variety of places and institutions. I feel as if I have become personally acquainted with these people. They tell me about their families, their students, their vacations, their frustrations. It is as if I have made twenty new friends all around the USA. On a more professional level, I have seen, by the process of writing, revising, and reviewing others' questions, a great deal of improvement in the ability of some of the writers to interpret objectives and write questions.

Although I am, on the one hand, happy that my work on SYNERGY is almost over, freeing up a great number of hours for me and thereby enabling me to work on several other projects, I will miss the conversations with the writers, the midnight calls to Lorne Kotler, the frantic messages to Ed Eisel, who wrote and helped us all maintain our computerized tracking program. I trust that, after so much time

and dedication to the task, the Testbank will be something of which Miami-Dade will be very proud and which will be instrumental in helping faculty at institutions all over the United States to assess weaknesses and measure progress of developmental students, thereby enabling these institutions to provide a more student-centered education for our neediest students.

Software Development

As faculty have reviewed and implemented instructional software packages, they have become keenly aware of what is available and useful and, throughout the process, have also expressed their dissatisfactions with certain content (and gaps therein) and prevalent modes of presentation. While the Project SYNERGY database of software modules has given us a healthy start toward helping underprepared students, it is neither ideal nor complete.

In our dialogues with software publishers and our efforts to articulate what we believe are some sound pedagogical principles, we have focused on such issues as the following:

- Role of immediate versus delayed feedback to the student.
- Use of multiple examples and modes of presentation.
- Provision for learner control of contexts and levels.
- Emphasis on interactive (manipulative) processes.
- Inclusion of adaptive sequencing.
- Attention to the relevance of what we learn.
- Reliance on self-correcting techniques for the student.
- Presentation of a variety of ways to solve a problem.

Attempting to address these issues, we have assembled two teams at Miami-Dade to design and develop illustrative PSI-compatible modules — one in mathematics and one in whole language.

The mathematics group is focusing its module on the learning objective **factoring trinomials**, with an emphasis on conceptually explaining *why* the objective is being covered and on providing for easy access to previous and/or related topics, user-friendly access to special math keys, increasing levels of difficulty to "push" the student to think critically, student interaction at every phase, access to a scientific calculator and on-screen scratch pad, guided help, step-by-step answer checking, and a variety of instructional modes to account for different learning styles.

The faculty designers are Joel Rappaport (Leader, North Campus), Diane Martelly (Homestead Campus), and Alice Wong (North Campus). Faculty critique person is Pat Leitch (Medical Center Campus). Instructional design assistance is being provided by Gail Piziali (Director, Center for Teaching & Learning); programming, by Al Gonzales (Chemistry & Earth Science, North Campus).

The whole-language group is focusing on a holistic approach to language instruction and learning by integrating listening, speaking, reading, and writing. Aiming to have the student distinguish the general from the specific, the abstract from the concrete, the module will prompt the student to produce one unified, coherent paragraph with a stated main idea and relevant support. The module will emphasize the processes that are crucial to the production of a piece of writing, be presented in the context of real-life situations, and be adaptive to promote student interaction.

The faculty designers include me (Leader), Barbara Sussman (College Prep, Medical Center Campus), Denton Tulloch (Basic Communication Studies, North Campus), and Elizabeth Wiegandt (International Students Program, Kendall Campus). Faculty critique person is Fred Wolven (English Core, Homestead Campus). Instructional design and programming assistance will be forthcoming.

Both teams hope to be able to beta test their modules this coming Fall Term 1995.

Part Two: Faculty Development in Implementing Software with Students

In this section we present observations, syntheses, and case studies concerning software implementation in Project SYNERGY over the last five years.

In "The Challenge of Evaluating Student Outcomes: The SYNERGY Experience at MDCC," Victor Nwankwo, Software Implementation Coordinator, highlights factors that facilitate and debilitate the institutionalizing of technology. Several MDCC North Campus SYNERGY proponents then talk about their individual experiences: Elaine Ludovici, in an interview with Kamala Anandam, discusses her professional evolution through several years as an implementor of software with writing students; Gina Cortes-Suarez, Associate Dean of Communications, presents her administrative viewpoint about the campus SYNERGY environment; Marlene Cueto discusses the course outcomes of her writing students; and Lonnie Pollard shares his observations about SYNERGY lab management. As Associate Dean of the Communications Division at MDCC's Wolfson Campus, Joyce Crawford discusses the progress of Project SYNERGY software implementation from a combined administrative/faculty perspective. Rose Anne Roche describes her experiences in starting up a SYNERGY Center on Kendall Campus. Carol Dietrick shares her thoughts as Lab Manager of the SYNERGY Center on Homestead Campus. The MDCC faculty case studies, organized by course, follow for all the campuses that have participated. The courses include *Preparatory Writing 2* (ENC 0002), *Introduction to English Composition* (ENC 1130), *College Preparatory Reading 2* (REA 0002), *English for Non-Native Speakers* (ENS 1443, ENS 1423), and *College Preparatory Algebra* (MAT 0024).

Featured also in this section are progress reports by the University of Tennessee at Martin and Richland College in Dallas on SYNERGY Center activities at their campuses. Finally, we present outlines by two community colleges in Florida —Indian River and Okaloosa-Walton— of their software-implementation strategies currently underway; we expect to have full papers for our next Project SYNERGY report.

We once again salute all the Project SYNERGY faculty and administrators who, by their persistence, have demonstrated their capability to harness technology's potentials to help their students. They have recognized that it takes research and replication to bring their students' outcomes as learners closer to their expectations for them with the help of technology.

The Challenge of Evaluating Student Outcomes: The SYNERGY Experience at MDCC

Victor Nwankwo
Project SYNERGY
Software Implementation Coordinator
Miami-Dade Community College

Under the auspices of Project SYNERGY and with grants from IBM and Title III, a SYNERGY Center has been established at each of the five campuses of Miami-Dade Community College and one each at Bakersfield Community College in California, Richland College in Texas, and the University of Tennessee at Martin. Each has enjoyed varying degrees of success and has encountered different kinds of problems. The earliest SYNERGY Center was established in 1990 at MDCC's North Campus and the most recent one in 1995 at MDCC's Medical Center Campus. While the hardware/software configurations have been different at each location, one common thread runs across all the SYNERGY Centers, and that is the evaluation of student outcomes.

As we examine the end-of-term grades of students using SYNERGY Centers and traditional labs across semesters and across two MDCC campuses, North and Wolfson, and as we work and talk with faculty who use the Centers, Kamala Anandam, Project SYNERGY Director, and I find that certain characteristics seem to consistently facilitate or debilitate the institutionalizing of technology. We present them as follows:

- It does take time for an innovation to take root in an institutional environment and become integrated into its operations.
- Faculty need an appreciable amount of time (preferably as release time) and assistance to understand the instructional software and how to integrate it with their curriculum. Reviewing software is safe and straightforward; implementing it is intimidating and complex, and there is a tendency to fall back into the comfort zone of the past. What facilitates the implementation is the availability of (1) the SYNERGY Center for the faculty to explore the software along with their colleagues, (2) a Software Implementation Assistant in the Center to support the faculty, and (3) some useful quality software. Although this arrangement could cut into the availability of the Center for students' use, it seems to facilitate faculty involvement.
- To complement the above arrangement is the need to connect computers in faculty offices to the SYNERGY Center fileserver so that faculty can explore the software from their own offices.
- Since it takes more than one replication to refine the way the SYNERGY Center will be used and provide adequate instructions to students, the results of initial studies may turn out negative.
- Evaluation of student performance tends to be static when the same method of evaluation is used repeatedly without

addressing or incorporating what is learned from the new environment and specifically from the software.

- It is the students' enthusiasm and motivation that win the faculty over to stay with the implementation. This process implies that the faculty get more involved the second time around than the first time. Results of some studies bear out this implication.
- Initially, the teacher-controlled classroom style is carried over to the SYNERGY Center, but as faculty progress through several semesters, they seem to let go of the classroom style and let the students use the software and progress at their own rates.
- Selecting and using one piece of software tends to be the initial choice of faculty. However, as faculty include more software to meet the varied needs of students, the student outcomes tend to be better.
- The extent of help available as faculty use the software with their students makes a difference. When they bring their classes to the Center, they need help. If, for instance, a student's screen freezes or the printer does not work, on-site assistance is critical. Where it is not available, faculty tend not to use the software.
- The more complex the software (as opposed to straightforward drill-and-practice), the longer it takes for the faculty to understand it fully and use it appropriately. As one faculty member put it, "Teaching a section of the same course as an overload requires less effort on the part of faculty compared to exploring new software and integrating it with their curriculum." This additional effort deters faculty involvement.
- Whenever possible, it is better to get the author or publisher of the software to provide an in-depth demonstration of its intricacies and capabilities so that they are not overlooked by faculty.
- Evaluation of student outcomes is perceived by some faculty as demanding, unnecessary, and in some instances, dictating the curriculum. Working with those who are willing to overcome these perceptions and helping them see evaluation as an instrument for change is a wise course.
- More positive outcomes are usually realized when research design and implementation are faculty driven and oriented.
- Financial support for upgrading hardware/software and buying new software is critical to the continued use of the Center.
- More discernible and consistent outcomes emerge from quiet corners of a campus where the faculty explore how to improve the learning environment for their students.
- Attempting to improve students' retention and success rates at the same time has yielded unexpected results. In some studies, it was observed that when retention rates were better for the experimental groups than for the control groups, the reverse was true for success rates.
- Term boundaries have a debilitating effect on the students who can progress faster and on those who need more time than a term to complete a course successfully.
- It is not easy to sustain the experimental-control group design since faculty may not be assigned two sections of the same course, may choose to use the SYNERGY Center for all their sections, or may teach different courses from one semester to another.
- Faculty seem to have varying criteria for assigning a "U" (or "Unsatisfactory") grade. Some prefer not to use it at all.
- By their choice, over time, faculty use the SYNERGY Center more for ENC 0020 and REA 0002 than for other courses. From an institutional perspective, the use of

SYNERGY Centers by faculty, whether they engaged in evaluation studies or not, seems to have yielded better results for ENC 0020 than for REA 0002 in terms of retention and success. **However, when the results for REA 0002 are examined for those faculty who engaged in evaluation studies, their results are positive.**

- There seems to be a difference in students' performance between Fall and Winter terms at North Campus.
- As faculty continue to use the SYNERGY Centers, they become concerned about differentiating the students who can benefit best from technology-aided instruction. Some are considering "locus of control" as the measure to use to make the differentiation. Concurrently, there is an increasing recognition of the need to diagnose students' difficulties and prescribe an individualized program for each student.

For descriptions of software packages used by Miami-Dade Community College faculty in their case studies, see Appendix D of this report.

"The Students Themselves...": An Interview

Elaine Ludovici has taught writing courses at Miami-Dade Community College, North Campus, for the past 20 years. She served as Coordinator of the Basic Communication Studies Writing Lab for 15 years and currently teaches in the English Department. She holds a B.A. and an M.A. in English (Clarion University, 1972 and 1974 respectively) and has completed some post-graduate classes in Education Administration at the University of Miami.

As a long-time advocate of the SYNERGY Center and as a teacher of both college-prep and freshman composition, Elaine Ludovici shared her thoughts in an interview with Kamala Anandam in February 1995.

Kamala Anandam: Elaine, I know that you have been using the SYNERGY Center since January of 1991. That makes it more than four years. You have been consistent and persistent in using the Center. Could you tell us what your motivation has been?

Elaine Ludovici: Simply stated, I liked what was happening in my classroom. Learning became student centered; the students became more active. The energy in the electronic classroom was . . . is stimulating! Students work collaboratively — on the hardware and the software — on their compositions in progress, on the proofing and editing process (not necessarily in that order, of course). In addition, I am able to work more closely with students while they write, while they study, while they take notes, and even while they are taking an exam.

However, my biggest motivation is the students themselves. Every semester, in both the class assessments which I administer throughout the term and in the Student Feedback Questionnaires administered through the Teaching/Learning Center, students often request that we spend more time writing on computers. My ENC 1091 students frequently claim that CSR is one of their favorite components of the course because, as one student reported, "it was able to address some grammar skills that the teacher was not able to cover in the classroom." And another student commented, "CSR explains in more detail the skills we are covering in class." (See Appendix D for Descriptions of Software Applications.)

Kamala: Do you conduct your class there? Or send them to the lab? Or do both?

Elaine: All of the above, Kamala. All of my classes are scheduled to meet twice a week, one day in the regular classroom and one day in the electronic classroom.

In ENC 1130, which is primarily a writing class, I have tried everything. I've had students compose on the word processor; I've experimented with *Realtime Writer*, and I've integrated grammar modules into the curriculum. Today, I have been using the lab primarily to supplement classroom instruction in that course. After I introduce them to the software, students spend some class time working on the CSR tutorials, but invariably, they will have to do most of the work on their own time.

In ENC 1091, which is primarily grammar, approximately one-fifth of their grade depends on how many tutorials they've completed on CSR. Although some class time is allotted for CSR, students spend anywhere from ten to twenty hours outside of class time in the lab.

In my 1091 night class, we meet in the lab at the beginning of the period and then walk over to the regular classroom. And that's when we

have the best follow up, because they've worked on a tutorial, and I've been able to observe firsthand their trouble with certain questions. So I suggest they copy the question for class discussion, and we're able to address it in the classroom. By spending time with my students in the lab, I've also been able to single out individuals who are having learning difficulties.

Kamala: By being present in the lab with your students, are you saying that you were able to observe their study habits?

Elaine: Exactly, and it is wonderful! Often I find that students are not aware of their own study behaviors — they are not aware that their low scores may be a direct result of their not reading the whole paragraph, not looking at the whole picture. When I point this out to them, their whole attitude seems to change.

Kamala: That kind of faculty intervention resulting from observation is not documented well and is, for the most part, overlooked. Is that what you are saying?

Elaine: Yes. And I guess I want to remind some people that computers can never take the place of a warm body. I've never been one to plug students into a machine and leave them. If anything, working in the SYNERGY Center has helped bring me closer to my students.

Kamala: I gather from your observation that the SYNERGY Center has impacted you as a teacher? Is this true?

Elaine: Oh yes, definitely. I see my students in the learning process more. And I can make different kinds of observations, not just about English, but about the way they approach a specific task. I, then, become more of a guide.

Kamala: Could you go back to when you got started? How did you feel then? How do you feel about your use of the SYNERGY Center now? Remember, we talked about an internal frame of reference for using technology. Can you share your feeling with us in the context of your own perspective?

Elaine: Well, I remember in the first semester of my research, I sent students to the lab and continued teaching the course with little if any changes in my curriculum. As far as I was concerned, the students would have to complete their CSR modules on their own time! But something happened to me by the end of the semester. During our regular class time, students began to ask questions about what they were working on in the lab. When I was covering how to punctuate restrictive and nonrestrictive clauses, a student asked, "Is that the same as essential and non-essential elements?" — the terminology used in CSR. Eventually, students began stopping by my office more frequently, some to discuss problems, but many to tell me they had scored 100% on their last test. Their enthusiasm was contagious and, for the first time, I was sincerely hooked — and determined to share in their experience. I wanted to teach in the lab.

Kamala: At the beginning you were in the Basic Communication Studies Department and taught ENC 0020. Then you switched departments; now you're teaching higher-level English courses, like ENC 1090 and 1130. What are your observations in terms of the appropriateness of the SYNERGY Center for these different courses?

Elaine: It's interesting because even though the courses are different, the students have similar needs. They need to be challenged. They need to be actively involved in the learning process. ENC 1130 is a transition course between ENC 0020 and ENC 1101. In fact, ENC 0020 students are required to complete ENC 1130 prior to enrolling in ENC 1101. ENC 1091 was designed for students preparing for the grammar portion of the state CLAST exam, but many students who have failed ENC 1130 or ENC 1101 flock to this course. For the CLAST-preparation students, I have aligned the tutorials with the CLAST competencies. This is where CSR seems most appropriate because after they finish the course, they will not be writing an essay to assess their skills. They'll be taking a test much like the tests they've completed on CSR. The

bottom line is that while the software available in the SYNERGY Center is not the answer to all of their needs, it is certainly a beginning.

Kamala: How does their performance measure up? There must be some way to evaluate student outcomes besides their feelings of satisfaction. Is there some benchmark you keep to know their performance is improving?

Elaine: I guess you have most of the statistics on that, but I believe you'll find higher passing rates at the upper levels. In ENC 1130, I give them a diagnostic essay on the first day of class, and at the end of the term, they have a department exam — a 60 minute, in-class essay scored holistically by two other readers.

In ENC 1091, students are assessed in a variety of ways. They are pre- and post-tested on CSR. They are given quizzes and tests covering their textbook assignments. To ensure skill transfer, both sentence-combining exercises and journal writing are evaluated.

Kamala: You don't always observe positive results in terms of students' dropout and success rates. We have found that to be true in ENC 0020. I really haven't looked at your data for ENC 1091 and ENC 1130. How does this affect you as a teacher?

Elaine: I suppose the answer to that depends on how one defines "positive results." If a student did not master all the skills necessary to move on to the next level, but did master some of them, then certainly that's positive, isn't it? Perhaps all that some students need is a little more time. Sometimes I feel our students are caught up in an inflexible time system; it doesn't allow them to work at their own pace.

Rather than getting discouraged at the end of the day, or at the end of a particular term, I remember the discerning words of one of my own college professors: "If I've touched one student, I've done my job." So if my offering this kind of eclectic approach to the learning process has helped one student, I've done my job!

Kamala: You are saying that there are two sides to success. One is tangible, such as grades and dropouts, and the other is the intangibles, such as helping students become better learners.

Elaine: Yes, but in addition, I am saying that there are a lot more variables involved. Grades and test scores do not necessarily reflect a student's true ability. In our English composition courses, including ENC 0020 and ENC 1130, students are required to write a four- to five-paragraph essay in sixty minutes. At least this was the case during the time of my research. Would the results have been the same if the students had not been timed? Would the quality of their final drafts have been the same? Not all students perform well under timed conditions. Similarly, there are other variables to consider when analyzing the dropout rate. For one thing, not all students drop a course because of a hard teacher or because the work is too difficult. Many, particularly in our inner-city environment, drop out because of personal pressures. Seldom does research acknowledge or follow up on this.

Kamala: If that is success, and I accept it, how can we make known that we don't look at grades alone? How could we make a case so that there is more to success than just the grades?

Elaine: That's a good question for which I have no answer, except to say that this is something faculty need to address, the qualitative side of assessment.

Kamala: But the reality is, we do have semesters and we do have grades. We probably need to spend some time as a group to discuss what, in fact, should be the criteria for success, the qualitative and quantitative aspects of assessment and how to measure them, and how to present them. Do you agree?

Elaine: In the portfolio process for faculty advancement, faculty have to demonstrate that their students have learned. Pre- and post-testing, therefore, seems to be a logical place to start. Is it, however, the sole measurement? I think not, and I think at Miami-Dade, at least, a faculty committee could address this issue as part of the teaching/learning process.

Kamala: Let me see, what else would I like to ask you at this time? I know you have great aspirations as a teacher to help your students: what is your perception of technology and research in fulfilling your aspirations? Do they help you? Do they hinder you? Do they do both? And when do they do each?

Elaine: Technology has enhanced personalized instruction. It has helped me to individualize, to work one-on-one. It has helped me in creating lesson plans and activities that are meaningful to the students. In that respect, it has helped to keep me focused and organized. It has helped me to give more control to my students, to give them more responsibility in daily activities. My classroom is much more student-centered.

At the same time, technology and research have not been without problems. Both create more work: training and experimenting with new hardware and software; planning lessons using new technology such as the LCD screen; planning lessons on *Realtime Writer* (using different features on *Realtime*, such as the teacher window, meant more work and more time); creating new activities for the software; re-creating old activities to better fit the electronic environment.

Another adjustment is the coordination with the lab staff. Once I get my teaching assignment from my department, I must coordinate my assignment with the lab staff; prepare a lab syllabus each term for the lab manager and rely on the lab staff to see that my request is programmed properly; meet with the lab managers and tutors to discuss course goals, expectations, role definitions, etc.; coordinate lab policies and procedures with my own; in the event of an absence, make sure a substitute can handle it for me; revise course outlines each term based on research outcomes; if a class doesn't make, coordinate a new class or have an "extra" preparation — teach one section with computers and one without.

With so many problems, so many adjustments, why do I continue? What the research doesn't show is the freshness in the classroom, the change in atmosphere. Before students appeared bored; they would stare at me or the board, but few would even take notes. Now students are more active and more inquisitive. As they read through software, they are not afraid to challenge its correctness. As they compose, they question the order of their presentations and revise.

Kamala: And, of course, it's more frustrating with technology, when something goes wrong. I'm sure that has happened to you.

Elaine: Oh, yes, because when it does happen, you realize that you are not in complete control over your domain. Sometimes the technology may be fine, but because of a communication problem between the teacher and the lab staff, your lesson plan is not ready. I suppose that's when you're truly challenged as a teacher and a leader because you must carry on — you can't just cancel class. (Anybody who relies on technology *that* much probably shouldn't be using it!)

Kamala: In general, let's try to change the focus from the SYNERGY Center, *per se*, and your curriculum, and think about the larger environment, the departmental environment, the institutional environment. What kinds of things in these environments help you, support you, when you attempt to use technology?

Elaine: Without the support from the administration, from the department level to the associate dean and above, I don't think I would have continued my work in the SYNERGY Center. From the very outset of my research, they were very encouraging. I was given some time to get familiar with the software and design my research; then during my research, I was given the technical support I needed. I was always reminded — particularly by the original SYNERGY staff — that I was in charge. That is, I could make any changes that I felt were necessary to meet my students' needs. After all, it was, indeed, my class, and ultimately my design. Hence, the formative evaluation was flexible — my students always came first.

I also appreciated having the technical support while I was teaching. The staff was so quiet,

almost invisible, but when I needed them, they were right there, taking care of any technical difficulties. I think Victor [Nwankwo] and Elizabeth [Sotolongo] spoiled me. They were a tough act to follow.

As more and more faculty begin to teach in the electronic classroom, there seems to be a greater need and appreciation for administrative support. Without more hardware and software, without more lab personnel, and without more prep time for faculty, it will be almost impossible to meet the growing needs of both students and faculty.

Kamala: One final question: if you were given your choices, what would be your top priority to make things better for you?

Elaine: For one, released time for training so that I can get more familiar with some of the software and revise some lesson plans to better fit the electronic environment. Second, more computers so that more faculty could teach in the electronic classroom. Right now we are running into schedule problems. The demand is greater than the supply.

Kamala: Project yourself into the future, if you will, and tell us what you envision.

Elaine: I really am far from being a computer "techie," but I would love to be given the opportunity to work with multimedia — and to experiment with teaching ENC 1101, for example, from my home. Then, from their homes, or from a school computer, all of my students could log on at the same time.

Kamala: On that positive note, let us end this interview. Thank you for your time.

The SYNERGY Environment at North Campus

Gina Cortes-Suarez is Associate Dean of the Division of Communications at Miami-Dade Community College, North Campus. She has been with Miami-Dade for 17 years. She has a B.A. in Elementary Education and an M.S. in Multicultural Education/Linguistics from the University of Miami.

In The Beginning

The SYNERGY Center at North Campus was established in June 1990. At the time, the campus was looking for a setting where faculty could experiment and use technology in ways that would enhance the instructional program. The original plan was to make this a multidisciplinary effort under the auspices of the campus' Center for Teaching and Learning. Several faculty members in our division became very involved in the review of software, experimentation, teaching, and research activities in the SYNERGY project. I think their enthusiasm was driven partly by the fact that it was our first opportunity to use computers in the classroom in a formal way.

It became quite evident after the second year that almost every faculty member involved with the SYNERGY Center was from our division. Therefore, the campus administration decided that the lab would be placed under my supervision. After one semester we realized that this was not the best way to manage the lab. It was obvious that it needed to be placed within an academic department. Thus, it was added to the lab program within the Basic Communication Studies Department, reporting directly to the department chairperson. This, in my opinion, was a sound decision since it

allowed the SYNERGY Center to become an integral part of the instructional program for underprepared students.

In this regard, the department chairperson at the time, Dr. Michaela Segall, became a key person. She played a major role in the beginning phases of the lab's implementation. She was most instrumental in creating an environment which both encouraged and sought faculty participation in all curricular decisions which involved the lab and its effect on the classroom. The department created an advisory committee to the SYNERGY Center. This advisory body works closely with the Lab Manager, Lonnie Pollard. It continues to be an important aspect of the labs' operation as it involves itself with the lab's hardware, software, and other issues relevant to the teaching/learning process. The Lab Manager is a member of the advisory committee.

An Administrative Perspective

The management and implementation of the SYNERGY Center requires a great deal of coordination and support. The lab is not simply an appendix to the department; it is integral to the total program. To support the department's mission of teaching underprepared students, the lab engages in ongoing classroom research. One aspect of this research is conducted by faculty and the other more informal research is carried out by the lab staff. The tutorial staff in the lab is another important factor that adds to its success. Tutors assigned to the lab are specifically trained for the role. They must have good knowledge of the software in the lab as well as have the skills necessary to tutor students in reading and writing.

The SYNERGY Center has made a major contribution in the delivery of the required double-contact hours in college-prep courses. This lab now plays an important role in providing instruction to students outside of the traditional classroom. Students utilize the services provided by the lab through faculty referrals and/or by attending during open lab hours. We also have a number of faculty who teach in the lab; this group has grown steadily as more and more faculty are familiarized with the technology and software. It also continues to be a testing ground for new software and computer-assisted instructional strategies.

During the summer of 1994 the Basic Communication Studies Department faced a major challenge. That challenge was to come up with a more cost-effective way to deliver the same program without compromising its quality. With the leadership of Melvin Smith, the present department chairperson, and a talented committee of faculty comprised of Susan Orlin, Donald Meagher, and Marlene Cueto, a design was created that allowed for maximum use of the paraprofessional staff and labs. In this new instructional delivery design, the SYNERGY Center became a central theme and focus for the department's computer-assisted instruction. The lab continues to have a dual role. It is used as an open lab, as well as a classroom by faculty who elect to teach in the lab.

Melvin Smith

The Future

In retrospect, I believe that several factors have contributed to the SYNERGY Center's evolution from a departmental add-on to an incorporated part of the classroom experience. These have been faculty involvement in the process, an on-going review of resources, open lines of communication, and finally a tremendous amount of support. We continue to search for better ways to implement the programs, seek new ideas, and of course, the never-ending need for additional resources keeps us at a constant vigil.

Our plans for the future include the expansion of the existing facility. This would allow us to increase the number of workstations and diversify the use of the space in order to accommodate more classes. We will continue to

review our software and hardware needs. We are seriously considering the addition of several multimedia stations and a multiplatform environment. With the beginning of the Fall Term of 1995, we will be involved in the piloting of Project SYNERGY Integrator (PSI) and have been selected to serve as a beta site for its implementation. We are looking forward to the new challenges and innovation that this participation will bring to our faculty and staff.

Observations about Course Outcomes for My College-Prep Writing Students

Marlene Cueto has taught in Basic Communication Studies, Miami-Dade Community College, North Campus, as an adjunct since 1988 and fulltime since 1992. She has a B.A. in English from Florida International University and an M.S. in Education from Nova University.

It is difficult to analyze or try to find reasons for variations of course outcomes in terms of grades and the holistically scored department exam. Some of the contributing factors are the way I use the "U" (or "Unsatisfactory") grade, my changes in course requirements throughout the years and the many variables I can't control or even begin to explain. However, I have made several observations. First, I have spent a considerable amount of time revising the lab assignments, the directions, the time allotted for each and so on. How I present the task, the time I give for completing it and the assistance I offer make a huge difference in whether or not students will complete an assignment and how well they perform. Obviously, I have made mistakes, and I am now making changes and improving in those areas which have caused the difficulties for the students, the staff and me.

Second, I have noticed that when I spend time in the lab with my students during my office hours, their attendance is high; students complete their assignments and are more positive toward the lab. During the six-week summer term I have fewer sections, so I am able to allot the time; perhaps because of my increased time in the lab, as well as the fact that I allow students more flexibility and time for the assignments, the performance of the six-week sections has been quite successful. During Summer Term 1992, 75 percent of the students who took the department exam passed and 70 percent passed the course with an "S" (or "Satisfactory") grade; during Summer Term 1993, 94 percent of the students who took the department exam passed and 59 percent passed the course with an "S" grade.

Third, some of the course outcomes (grades) are misleading because I have not dropped students but instead assigned a "U" grade to no-shows, students who stop attending or students who do not complete all the course requirements for a "P" (or "Progress") or "S" as indicated in the course syllabus. For instance, during the Winter Term 1993 (92-2), the results of the five sections I taught were above the department average. The section using the SYNERGY Center (sequence #36160) had the highest course passing rate and the highest department-exam passing rate. This section had both high- and low-level students. Furthermore, of the "U" grades assigned to the section using computers, two were no-shows and one was a student who stopped attending. Therefore, only

one student of those remaining truly received a "U" grade. It is important, however, for me to note that all sections during the 92-2 term scored considerably high on the department exam.

In Fall Term 1993 (93-1), all sections were assigned to the SYNERGY Center. Of the five sections, two fell below the department average passing rate of 57 percent for that semester. Although the success rate appears low due to the final grades, it is a little misleading. For instance, sequence #21100 had only sixteen students remaining in the course. Of these sixteen, 62 percent passed the course. Of the four "U" grades, one was a no-show and two

Table 1
Grade Distribution for ENC 0020

Term	Sequence	Group	N	S	P	U	W	Other
92-1	21085	S(C)	26	35%	35%	19%	12%	—
92-2	36160	S(C/L)	22	73%	5%	18%	5%	—
	36185	S(C/O)	21	67%	24%	10%	—	—
	36140	T	23	65%	26%	9%	—	—
	36155	T	26	58%	27%	8%	8%	—
	36195	T	21	57%	29%	10%	5%	—
93-1	21175	S(L)	20	35%	50%	—	15%	—
	21150	S(L)	22	46%	18%	18%	18%	—
	21125	S(L)	23	52%	30%	13%	4%	—
	21100	S(L)	21	48%	24%	19%	9%	—
	21060	S(L)	20	70%	20%	10%	—	—
93-2	36710	S(L)	25	44%	36%	16%	4%	—
	36185	S(L)	27	44%	30%	15%	11%	—
	36190	S(L)	26	46%	12%	23%	19	—
	36205	S(L)	23	26%	30%	39%	4	—
	36245	S(L)	18	28%	22%	44%	6%	—

S=SYNERGY Group T=Traditional Group C=Class L=Scheduled Lab O=Open were

assigned to students who stopped attending. Another example is sequence #21150. Of the four "U" grades, one was a no-show and three were assigned to students who stopped attending. Only fourteen students remained by the end of the term. Of these fourteen, 71 percent passed the course. However, sequence #21175 had the lowest passing rate for that semester — 35 percent. Looking at the students' records for that term and comparing sequence #21175 and sequence #21060, which had a passing rate of 70 percent, I noticed only a few subtle differences. Sequence #21175 had five students who were attempting college prep for a second or third time; a few were ESL or learning disabled, yet most completed their work and had satisfactory attendance. On the other hand, sequence #21060 had mostly first-time college-prep students whose skills were much stronger at the beginning of the term. Only two students were attempting college prep a second or third time, a few students were recommended to ENC 1101, and there were no withdrawals. It is possible that the students' success skill level at the beginning of the term plays a role in the students' outcome (final grade) during that term. However, further research in this area would be necessary before drawing any conclusions.

Two of the five sections during Winter Term 1994 (93-2) fell below the department exam passing rate of 57.5 percent. All five sections were scheduled in the SYNERGY Center.

However, once again the results are misleading. In sequence #36190, three of the six "U" grades belonged to students who had stopped attending. Two of the eight "U" grades in sequence #36245 were also for students who had stopped attending. Two of the four "U" grades in sequence #36185 were for no-shows. Finally, of the nine "U" grades assigned to sequence #36205, one was for a no-show and three were for students who stopped attending. A little less than half of the students in all five sections were attempting college prep for a second or third time.

It appears that regardless of the lab setting, the time of day, the tutors, or the teacher, certain sections simply perform better than others do. I really believe that more emphasis needs to be placed on the type of assignments, the directions, the time allotted and the flexibility offered to students in terms of the tools for learning. In offering all choices to all students, we may discover that technically inclined students may perform significantly better using the computer, while students who learn better using a traditional method will benefit greatly from that approach.

Project SYNERGY Lab Management at North Campus

Lonnie Pollard has been Director of the Basic Communication Studies Computer Learning Center, Miami-Dade Community College, North Campus, since August 1993. He has a unique combination of extensive experience with data communications, computer operating systems, software, and hardware; work as an adjunct instructor; and independent study in the humanities. He holds an A.S. in Electronics Technology and an A.A. in Computer Science from Miami-Dade and a B.S. in Computer Information Systems from Barry University, Miami, Florida.

The Basic Communication Studies (BCS) Computer Learning Center (a Project SYNERGY Lab) unites humans with technology such that the total effect on students is greater than the sum of the individual effects. The human element is crucial to the lab's success, and this is where we concentrate much of our efforts. Because many students are fearful of the technology, we go to great lengths to put them at ease. The orientation gives us our first opportunity to make the students feel that the lab is an inviting and nonthreatening place to develop their communication skills. I plan the orientations keeping in mind that we don't expect the students to know anything about computers. We walk them through the steps and work with them as much as is needed. We want the students to concentrate on developing their reading/writing skills, not on worrying about their computer literacy. We continuously strive to structure the technology around the students instead of the students around the technology. The network is only one of many elements of the lab as a whole.

We are in relentless pursuit of integrating computers into the educational process. Like hammers and power saws, computers are merely tools, albeit enormously valuable tools. They can enhance the educational process, but can no more replace people than did the textbook. Their potential to aid automation is enormous, but it would be a mistake to divorce people from this automation. People are very

important to us; many people have contributed to the development of our lab and I cannot possibly give due thanks in so short a space.

Though I am indebted to all instructors in BCS, there are four that I am especially indebted to for their assistance and advice in sculpting this learning environment. They are Marlene Cueto, Karan Barnes, Don Meagher, and Susan Orlin. The support of these instructors has been essential to our growth. They've helped me give birth to what now seems more a living entity than a mere lab. I am also thankful to be working alongside the BCS support staff. Of special mention is the invaluable assistance of Margarita Sastre, who has been in full support of us from the very beginning.

Getting the level of performance that I want has meant my having to assemble the best staff possible. I seek driven and energetic individuals who care about their work and are able to work well with others. I expect a lot from my staff, and they never stop delivering.

Daniel Ramos

Daniel Ramos is our network specialist, and his knowledge of Novell Netware is phenomenal for a person of his youth. Though our equipment is antiquated, he works his magic on the machines and makes the most of them. It seems that not a day goes by that he doesn't find a way to make some operation easier for the students, find a way to cut costs, find a way to make things more efficient, or find a way to improve network performance. He has been invaluable in the development of our present network environment.

Paul Blanchard

In the evenings, I need a person who combines human relation skills, management skills, technical ability, and the ability to maintain grace while under pressure. Paul Blanchard is that person, and he is the evening monitor. I leave for the evening knowing that the lab is in good hands.

I pride myself on the tutors that I have obtained since coming to BCS. They are central to the development of a learning environment that facilitates the interface of students to technology. Our target is the ultimate learning environment, and it is only with tutors such as the ones we have that we will realize that end. The tutors have excellent knowledge of the reading/writing skills and have been trained to work in harmony with the network for a truly synergistic effect. These tutors have included Christina Santiago, Arlene Rudder, Bernardee Warburton, Marsha Warburton, Clausel Renoit, Peter Smith, Mohammad Awan, and Kairy Walker. I could not think of our lab as a "Learning Center" without tutors of their caliber.

Running a center such as ours involves a range of demands that is multifaceted. Not only must we manage the center, much like any traditional tutoring center, but we must also handle a wide range of additional demands. We must manage the network, including installing and maintaining all network components, and we must administer the network operating system. We have a limited number of workstations, and it is crucial that we keep all of them operating, so we repair all hardware failures ourselves, thus significantly reducing downtime. (We repair most stations within an hour.) We install and maintain all software, including resolving software conflicts. We optimize the network/hardware/software to squeeze peak performance out of what equipment we do have. We not only must innovate, but must do so under tight financial constraints. We must protect the network from virus invasion. Each semester we must create all classes within the classroom-management software, add all students into the network, enter the students into each of their classes, enter the students into each of the tutorial programs, and enter in the needed modules for each student. We have had to become highly knowledgeable not only about the module-management software for each of the programs, but also about the programs

themselves, so that we can pick modules that are appropriate to the needs of individual students. The tutors have had to learn how to work as a supplement to the tutorial programs, and how to assist while remaining unobtrusive.

There seem to be as many approaches to teaching as there are teachers, so we customize around all instructors as well as we can. We must remain flexible and work with the students according to the needs of each instructor. We must gather information and feedback from the instructors so that we are able to work in synch with them and find improved ways of serving our support function. We produce forms and handouts that help the students operate the programs and that help the instructors understand what programs and modules are available.

Technical expertise should reside within the labs; by having technical expertise we are better able to put the students at ease with the technology and keep them focused on developing their skills. Students feel more at ease having technical people standing by at all times to rescue them from trouble. It is not uncommon to have to use utility programs to save a student's files, or to have to save a student's present file to the network (such as when a floppy drive stops functioning), and then to copy the student's file to his or her disk at another station. Bailing students out of difficulties is just a normal part of day-to-day operations. Sometimes the network crashes during a class or lab session, and we move immediately to putting it back in operation.

Although my extensive technical background, experience in education, and other related experience have all served me well in my capacity as director, not having complete mastery of the writing and grammar skills is the Achilles heel I struggle ceaselessly to overcome. Once I have full knowledge of the subject, I will feel fully equipped to lead the center to a whole new level. Writing new software tutorials will be one key item and one of the biggest needs for our future. I am pleased with our past results, and I look forward to the future and what we can make of it.

I close by thanking Gina Cortes-Suarez, Melvin Smith, and Michaela Segall for the support that they have given us. I also thank Kamala Anandam, Victor Nwankwo, and Lorne Kotler for the support that they have given us from Project SYNERGY.

Wolfson Campus SYNERGY Center: Then and Now

Joyce Crawford is Associate Dean of the School of Communication at Miami-Dade Community College, Wolfson Campus. She has been with Miami-Dade for 17 years. She has a B.A. in English Education from Florida Atlantic University and M.S. degrees in English Communication and Reading, both from Florida International University. She also has an Ed.D. in Curriculum & Instruction from the University of Florida.

From the very beginning, I felt that having a SYNERGY Center would be the start of a dream come true. Since using the Center, I have witnessed individual student accomplishments of mastering course objectives and have seen those students move forward with their own dreams. However, we have not been able to amass an overwhelming record of student success and teacher endorsement, primarily because of lack of confidence in the software.

To many teachers, the available software programs seemed to turn into giant labyrinths which trapped students with no exit. Of course,

the students became frustrated and so did the teachers. In fact, the disappointments were so great that instead of embracing technology, many of the teachers and students appeared to be backing away from using computer-assisted instruction.

Operationally, we made some mistakes. We assumed that our instructors would have enough time to complete all of their responsibilities, including teach a full load and learn new software. We didn't budget for a full-time technician, and the instructors felt helpless without the technicians to handle the equipment.

We didn't budget for backup equipment. If the computer, printer, or cable were not operational, we simply lost the use of the equipment for too long a period of time waiting for replacement or repair. Of course, that was valuable instructional time that we lost.

If an instructor became frustrated with the software or equipment, the teacher simply turned off the computers and went back to using traditional tools. That meant that we had a class period with the computers down that someone else or other students could have benefited from. We should have had a system that would have allowed a teacher and her class to move out of the computer room and someone else to move in. But due to room constraints and scheduling problems, we weren't able to do that.

I think we were unrealistic in expecting that the teachers would be able to balance all their other responsibilities, take the time necessary to learn new software and the nuances of the machinery and feel comfortable enough to use the technology as an instructional delivery tool.

Nonetheless, we did have some pioneering teachers, including me, who worked through the software dearth, authored material and just watched their students' confidence and progress soar.

As we are planning and reorganizing for the future, I believe any computer-assisted instruction would be better utilized by allowing the students to schedule themselves into the Center, independent of classroom instructors.

We envision a computer courtyard with SYNERGY incorporated into that courtyard. In fact, we have even dreamed of having that courtyard open twenty-four hours a day, seven days a week. This way a student could come in, log in, and go right to work. I believe that would allow a better utilization of computers, better use of the student's time, and a teacher wouldn't be tied into the Center, if he or she were not going to use the computers. We're also recommending released time for instructors to learn new software and become more comfortable with the computers.

I continue to dream of computer-assisted instruction, but now those dreams have hit the highway and include multimedia, Internet, interactive video and everything else technology has to offer.

Starting Up a SYNERGY Center at Kendall Campus

Rose Anne Roche has been with Educational Technologies for most of her 21 years at Miami-Dade Community College. She has worked extensively with faculty and administrators throughout the college in the development, programming, and implementation of a variety of PC and mainframe CMI programs such as Camelot and RSVP. She is currently the Software Implementation Coordinator for the Kendall Campus SYNERGY Center. She has a Master's Degree in Education from Barry University, Miami, Florida.

In the Fall Term 1994 (August - December) I had the opportunity to discover what it takes to get an electronic classroom up and running. This came about with my involvement in establishing the Kendall Campus SYNERGY Center. My experience was sometimes frustrating but in the end very rewarding.

In the summer of 1994, when I began this new assignment and I walked into Room 6359, Kendall Campus, the server and workstations were on-line, but there was still an array of cables, software packages, and diskettes scattered about the room. A viable learning environment was definitely not in place!

Working with the network specialist and my mentor, Victor Nwankwo, I helped get the cables in place and test the server, workstations, and software. When it came to cleaning, scrubbing, throwing out the trash, and dealing with the problems of rain coming in the window onto the computers, I was the expert.

Once the space had some semblance of a classroom, I started reviewing the software and putting together some condensed information about each program for the faculty. I expected them to come rushing through the door, full of enthusiasm and eager to look at all the software packages. Unfortunately, I had only a few customers.

In spite of the disappointment, Victor and I continued with our endeavors to get the center in order, anticipating the arrival of the first class. We set up the student database in ICLAS (IBM Classroom Administrative System). We downloaded the student records from the mainframe and transferred them to the network; this is a timesaving task (the result is accurate student recordkeeping). We prepared student guidelines for the center and an instruction sheet for each software program. We developed faculty handouts of software descriptions and organized schedules for classes. Although these materials were seldom given any attention until the students and faculty became comfortable with their new environment, these printed aids are necessary, I believe, for organization and accountability.

Fortunately, when the first class arrived, the center finally had an atmosphere for learning. The room was spacious, with large windows facing in two directions. It was an impressive sight with the gray carpet, the maroon comfortable-looking chairs, and the new computers that sat on sparkling white tables.

The first class was given a brief orientation, and class. However, that was not the situation in many classes that followed where the faculty had no experience with the software or technology. Some arrived with their students on the recommendation of a colleague. Often they had no prior knowledge about the content of the software. Fortunately, we were able to intervene until the faculty became more at ease. We gave them as much support as possible. We wanted them to feel comfortable and we did not want them threatened with hardware breakdowns, software that is full of bugs, and uncertain procedures. Ideally, as electronic classroom specialists, we would like to have been resident faculty members who had hardware, software, and reading, writing, and math expertise; and who could be present in the center twelve hours a day, leap from high buildings, and be faster than the speed of light. Unfortunately, the budget does not pay salaries for those kinds of skills.

Cookie Llamas
SYNERGY Center
Lab Assistant

I have had some perks with this job. One is the experience of working with ESOL (English as a Second or Other Language) students who have never touched a computer. At first the mouse is not at all friendly toward them, but it is amazing how quickly they have adapted to the computer and that silly device called a "mouse." So many of them would come to the open lab sessions and work on their projects with the various software packages. I sensed the positive reinforcement they received from the computer activities that gave them pride and accomplishment in the work. The most personally rewarding experience was that all of the faculty wanted to return with their students to the SYNERGY Center the next semester.

The SYNERGY Center at Homestead Campus

Carol Dietrick has been with Miami-Dade Community College since 1986. She worked as supervisor of Disabled Student Services Learning Center (North Campus) until 1990, when she moved to the Homestead campus and coordinated the development of the Learning Support Center. She received her B.S. in Physical Education from Coker College, Hartsville, South Carolina, in 1964, and has completed graduate courses in Specific Learning Disabilities. She has developed a keen interest in the use of multimedia as a resource for providing academic support to underprepared college students.

The Homestead Campus SYNERGY Center is housed in the Learning Support Center and is a fully integrated piece of the Homestead Campus network. This state-of-the art lab offers the latest technical equipment, programmed learning tools, and tutorial support for reading, writing, and math classes. Designed to meet the needs of a diverse group of students, this comprehensive lab's primary function is to provide basic-skills remediation to college-prep students through the use of diagnostic and prescriptive learning materials. We maintain the human touch through the use of tutors who clarify concepts and teach learning strategies which help students to become more independent and self-directed.

The lab management team interacts with faculty and students on an on-going basis. Homestead faculty members evaluate software and materials and make recommendations for the lab, which has a comprehensive selection of SYNERGY software, as well as the campus' standard audio, video, and interactive laser disk programs.

Faculty members review and make revisions to the lab syllabus each term. Students' folders are available to faculty throughout the term, and printouts of lab attendance are placed in faculty mailboxes each week.

Nathaniel Mellerson
Assistant Lab Manager

Our students are not intimidated by the use of technology because they are required to take OST 1700, a facilitated course that teaches computer survival skills, word-processing skills, and how to use CD-ROMS and laser disks. We encountered few problems setting up the lab because it was easy integrating SYNERGY software and hardware into the existing network. It is essential, however, that SYNERGY labs have adequate support staff. Without support, software and hardware problems can become overwhelming. Setting up and managing a lab requires individuals with technical and educational training, a philosophy that all students can learn, and a commitment to practice this philosophy.

M-DCC Faculty Case Studies with SYNERGY Center Students

A teacher helps a student away from the computer.

A student works on a writing project.

Students collaborate in the SYNERGY Center.

ENC 0020 in the SYNERGY Center

North Campus

Stephanie Packer has taught at Miami-Dade Community College, North Campus, since January 1994. She also has taught at the University of Miami and Dade County Public Schools. She received her B.A. from Florida International University in 1977 and M.A. and Ph.D. in English from the University of Miami in 1982 and 1985 respectively.

The Setting

About the Students

Underprepared writing students at Miami-Dade are identified at registration by MAPS (Multiple Assessment Placement Services) or the CPT (Computerized Placement Test) and then placed in one of two levels of developmental composition. They must exit the upper level of these non-credit courses in order to proceed to elective and core English classes. To exit, students must pass a holistically scored departmental essay exam and meet a 20- to 35-hour lab requirement (as well as other requirements set by the instructor). They have three semesters to exit the program.

Our students possess a wide range of skills, even within one course level. They range from a returning student with a solid secondary background who just needs a refresher to a recent completer of the ESL program to a student who has graduated with a special diploma. And each such thumbnail sketch, of course, includes a universe of further possibilities.

Many of our students must also take reading and math College Prep courses before they can proceed with their core courses, and too many get discouraged before they reach their full potential. Thus any environment or methodology which could improve retention among these at-risk students seemed worthwhile to investigate.

About the Software

The spring and summer before the study began in Fall Term 1994, I spent several hours a week reviewing some of the software available in the recently expanded SYNERGY Center. I'm afraid greed got the best of me at the electronic smorgasbord. In my zeal to provide copious drill-and-practice material on the skills which are problem areas for our students, I assigned drill-and-practice modules from CSR and PLATO for the first three weeks. Then, as we prepared for the first essay assignment, we moved in the lab to *Writer's Prologue*, a content-generating program with writing prompts to encourage the expansion of details and examples. Students emerged from the *Writer's Prologue* session (on the essay mode of Explaining) with a very rough draft, which they then refined the following week on *Norton TEXTRA*, an easy-to-use word processor. We had three more *Writer's Prologue* sessions (Description, Narration, Argument) followed by word-processing sessions the next week to move the material they had generated on to completion. These more content-based lessons were interspersed with grammar drill-and-

practice units from *Skills Bank* and *GUIDES*. I also made individual prescriptions on PLATO in the two weeks before the departmental exam. The last session of the term was a networked "dialogue" using *Realtime Writer*, when the class held an electronic discussion immediately following the final exam.

In my anxiety to ensure that students had plentiful resources, I probably engaged in overkill. However, many of our students approach a lesson like a road race, in which he who finishes first wins. I had visions of students' running out of material and resisting correcting their work because "we've already done this!" Although I wouldn't assign so many different kinds of drill-and-practice software again, at least the students weren't bored, idle, or resistant to additional practice on their problem areas. They may, however, have reached a greater degree of comfort using only one type of drill-and-practice software, if any one program offered sufficient multiple exercises on typical problem areas.

The Design

Two ENC 0020 classes, the higher level of developmental writing, were randomly selected for this study. The experimental group attended their weekly lab session in the SYNERGY Center, while the control group attended in the conventional College Prep Writing Lab (CPWL). The experimental class met twice weekly in the afternoon, while the control class met weekly Friday mornings. Each class followed the same course syllabus. Each class was pre-tested using a diagnostic writing sample holistically scored by me and another full-time faculty member. Students were post-tested by the departmental final examination, holistically scored by at least two faculty.

Demographically, the experimental group was 24% Haitian, 14% African American, 9% English-speaking Caribbean, 38% Hispanic, 14% non-Hispanic white. The control group was 20% Haitian, 20% African American, 30% English-speaking Caribbean, 30% Hispanic, 0% non-Hispanic white. The mean CPT score was 57.0 for the experimental group and 60.8 for the control.

Since my previous experience had been that students are predisposed to enjoy the electronic medium (even to the telling phrase "playing with the computer"), and since I was excited about the possibilities for instruction, I expected great enthusiasm about SYNERGY Center attendance. Complaints are sometimes heard from students that the CPWL is "just a study hall" or "I could do this at home," so I believed that the experimental group would demonstrate better attendance, motivation, attitude, and retention. I had several hypotheses: (1) lab attendance would be better in the SYNERGY Center than in the CPWL; (2) greater consumer satisfaction and sense of ownership would be achieved in the more self-directed SYNERGY Center; (3) thus, there would be higher retention in the experimental group; and (4) this retention might be reflected in ultimately better performance as measured in final-grade distribution.

While I didn't necessarily expect any significant difference in final-exam or final-grade distribution, since no research I had looked at showed such a difference, I still wanted to monitor the results for any unexpected insights. I was also interested in determining if any correlation could be seen between lab attendance and final-exam outcome in either group.

I attended the electronic lab sessions with the experimental class, but I was unable to do so with the control group because of a scheduling conflict. So there was a bit of a prejudice built in. I adjusted for this, however, by dropping in on the last ten minutes of the control group's lab sessions, and even this support I think balanced things somewhat and encouraged attendance.

Monitoring the Study

I kept records of both groups' lab and class attendance, test scores, writing assignments, and retention rates. We went over the control group's lab assignments at some length in class

(fortunately, the class met the next day, so the lab assignments and any questions arising from them were still fresh in the students' minds). I monitored the students' progress firsthand in the electronic lab. There I was able to confer with students about their writing and also observe if anyone was having keyboard problems, becoming overwhelmed or confused, or progressing smoothly. In general, the students seemed to adapt well to the SYNERGY Center.

Some problems did arise with the SYNERGY Center that the CPWL, in operation longer and without software challenges, was not prone to. Sometimes limitations in computer resources caused bottlenecks, and students had to wait while memory was managed or software was loaded. My lack of familiarity with certain aspects of the lab made some sessions less than ideal; for example, I wasn't aware that the extra memory that programs like *Writer's Prologue* require can wreak havoc on the rest of the lab. Fortunately, we were aided by an excellent lab staff who efficiently worked through any first-time snafus that arose. Once students did get on task, they seemed to enjoy the instantaneous feedback offered by CSR, PLATO, and the various skills modules. Although I was very enthusiastic about the possibilities of *Writer's Prologue*, the students were in general cautious, perhaps because that program is working on higher-order skills and thus cannot provide the same kind of feedback. Although I liked *Writer's Prologue* because it isn't just another drill-and-practice package, I would be leery of using it in the current lab until a new version comes out that uses less memory. Our Lab Manager informs me that he has spoken with the company, voicing our concerns, and a new version will be available some time in the near future.

Halfway through the course, I learned that some of the students in the experimental group were making appointments with the tutors in the CPWL to go over their papers with them. I applauded their initiative, but that sort of cross-pollination hadn't been built into the study. I had thought in terms of all-electronic or all-conventional, but the students taught me an important lesson. "Congratulations, you scored 100%" flashed on a screen is just not the same as a human being going over your paper line by line. On the other hand, not even the most patient instructor or tutor will have time to explain sentence fragments fifty times; the computer, though, has all the time in the cyber-world. This experience made me realize that there is no good reason why students shouldn't have the best of both worlds. Thus, during the course of the study, I moved toward a desire for fusion and complementarity in using our human and electronic resources. Neither resource has the complete answer.

Perhaps because of my too-varied assignment list, the experimental group also reported being confused or insecure about which assignment they were supposed to be completing which week. Even though I was in the lab with them and offered reassurance, they seemed to become uncomfortable when a classmate at the next workstation was working on a completely different assignment from theirs. Individualized instruction is one of the great possibilities of the electronic classroom, I think, so in the next replication of this study, I will make a point of explaining up front to the experimental group that their neighbor may not be completing the same assignment or working at the same pace as they are, and that as long as they are making progress, this shouldn't be a concern.

The control group, directed to the conventional CPWL, was given a list of skills assignments based on the lab handouts and on specific grammar chapters in their course text. They were assigned an excellent tutor who worked with them all semester. Because there were no interfering technical problems, the control group's time on task may actually have been greater, though I have no explicit way to measure this, and is in any case a symptom of the newness of our electronic lab. Prescribing for individual problem areas was somewhat simpler in the conventional lab, as no software had to be loaded, but rather all that was needed was a simple notation — "J1, Fragments, for Javier" — and I could rest assured that J1 would indeed be available for Javier. When I

dropped into the lab during the last ten minutes of sessions, I observed the students busily engaged in completing their assignments and conferring with Eileen, their tutor.

This class of fifteen regularly attending students had a positive response to the CPWL, perhaps because of its small size and rapport with one tutor. Other classes, in noisier settings, have not been so positive, to say the least. The class could also discuss any questions arising from the lab assignments in our class session the next day, while this wasn't possible (nor should it really have been necessary) for the electronic modules. With the exception of two weeks when students were working on individual prescriptions, the control group was generally working as a class on the same assignment. This also seemed to reassure them. They didn't perhaps feel the sense of isolation that can be the flip side of electronic autonomy, particularly for non-networked assignments.

Outcomes

As Table I indicates, my hypothesis that attendance would be better in the electronic lab than in the conventional lab was not validated here. This is a very fluid number, and I think it will be interesting to compare this result with next semester's when the lab and I both have more experience with each other.

Table II shows that although the experimental group tested marginally higher on the diagnostics, the mean CPT score for the class was 3.8 points lower. This will be interesting to monitor in future studies.

Tables III and IV show the performance of the students in both experimental and control groups.

Table I
Lab Attendance, mean hours, of 18.5 Required

Groups	Lab Attendance Hours	
SYNERGY Lab N=15	Experimental	13.00
College Prep Writing Lab N=22	Control	16.50

Table II
Pre-Test - Diagnostic Writing Sample

Student Score	2	4	6	7-8
Experimental N=19	—	100%	—	—
Control N=13	—	95%	5%	—

Table III
Post-Test - Departmental Final Essay Exam

Student Score	2	4	6	7-8
Experimental N=19	—	32%	63%	5%
Control N=13	—	23%	69%	8%

Table IV
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental Group (N=22)	59%	18%	9%	14%
Control Group (N=20)	45%	15%	30%	10%

Retention

Retention was computed by comparing grade rolls from the third week of classes, minus no-shows, to the number of students taking the final exam. The experimental group had 90% and the control group had 86%. There is some difference in retention, with the experimental group demonstrating 4% greater retention. While I cannot attribute this exclusively to the use of the electronic lab, it is a promising figure which will hopefully increase as we learn more about what motivates students now.

The slight gain in retention may also speak to the consumer-satisfaction issue. In this particular study, both groups were responding to positive situations. Both groups seemed well disposed to their labs, but in different ways, so comparing the two becomes a question more of comparing different positives than of contrasting a positive and a negative .

Strengths and Weaknesses of the Labs

CPWL. Students commented on strengths as follows:

- A tutor will sit with you and go over your paper.
- I like working with the same tutor all the time, someone who knows me.
- On the handouts, I can ask questions if I don't get something.
- I can make appointments on Saturday.

The following are the weaknesses of the CPWL lab:

- Sometimes I couldn't get in during open lab.
- It's noisy during open lab.

SYNERGY Center. Students perceived the following as strengths of the electronic lab:

- I can use different software.
- I can make appointments.
- *Realtime Writer* was fun (we should do it more).
- I can take the same module as many times as I need to.
- The tutors helped me with the computer.

The following were considered weaknesses of the electronic lab:

- I had to wait while software was loaded.
- When I went on my own, I was confused about the assignment.

Instructor's Improvement

As an instructor, I would do the following differently:

- Simplify the assignment list.
- If one brand of drill-and-practice software has sufficient levels and modules, stick to that as much as possible.
- Carefully explain my instructions and needs to the lab staff.
- Check with the lab staff the day before to see if any problems have arisen.
- Before using *Realtime Writer*, remind the class about appropriate language and accountability.
- Remember that responding to an article or piece of writing works better than an open conversation.
- Think more in terms of merging our human and electronic resources.

- Something as mundane as a comfortable table and chairs for tutor conferences in the electronic lab might maximize use of both our excellent tutors and the promising software.

Significance of the Study

In conclusion, the SYNERGY Center has great potential, but in spite of the greater possible, students do not seem satisfied to interact simply with computers alone. They want the full spectrum as they acquire and test new knowledge. As we work out the interfering technobugs and administrative problems, the electronic environment offers us the chance to improve — and finally revolutionize — the delivery of instruction. O brave new world, indeed, that has such wonders in it. But we can see it won't be enough to summon the electronic genie alone. We'll need to build a comprehensive supporting environment where electronic instruction is one of the choices that make sense in students' lives now.

Wolfson Campus

Sandra M. Castillo is an Associate Professor of Language Arts at Miami-Dade Community College, Wolfson Campus. She has been with the Wolfson Campus Communications Department for 7 years. She received her B.A. and M.A. in English from Florida State University in 1985 and 1987 respectively.

The Setting

In my first study (reported in Project SYNERGY's *Year Three Report*) I used the SYNERGY Center with my ENC 1130 students rather than with the ENC 0020 students. I discovered that when classes meet three times a week, for only fifty minutes, students do not have enough time to complete a writing assignment within a class period, especially when they are required to use computers. Thus, I consider that a class which meets twice a week for one hour and fifteen minutes has an advantage. It seemed appropriate to use one of these classes as an experiment to see how students would perform in working with computers given this time advantage.

About The Course

For this study, I taught ENC 0020, a basic writing course in the College Prep section of the Communications Department. In ENC 0020 students generally spend half of the semester reviewing grammar skills and the other half writing developed paragraphs.

During Fall Term 1994 (August-December), I taught two sections of ENC 0020, one with computers (the experimental group) and one without computers (the control group). My "regular" ENC 0020 class, the control group, met Mondays, Wednesdays and Fridays from 10:00 to 10:50 a.m. while the experimental group met twice a week, Tuesdays and Thursdays, from 9:25 to 10:40 a.m. Although my computer-assisted ENC 0020 had a time advantage, I believe the computers themselves were partly responsible for the final-exam results, which I will be discussing here. Thus, again, this supports my main premise and concern, the time factor.

About The Students

Our grammar midterm exam helps us to determine who is ready for the final exam,

which consists of a ten- to twelve-sentence paragraph with a topic sentence, supporting details and a concluding line. There are students who actually pass the midterm grammar test with the mandatory 80%, but fail to receive the necessary passing score on their final exam, making them ineligible to go on to the next level (ENC 1130). In part, this is due to the fact that students can actually learn the grammatical principles of sentence constructions and verb forms but often are unable to apply these grammar rules because they have English as a Second Language difficulties. For those students, passing ENC 0020 is more than a sixteen-week class; it is a struggle with language, a struggle with culture. These students have a much more difficult time not only passing the class on their first attempt, but writing a paragraph under any time constraints. This is especially true if the class is only fifty minutes long. For these reasons, I must take the time factor into account.

Having said that, I'd like to add that I believe that the ENC 0020 SYNERGY class (experimental group), which met on Tuesdays and Thursdays, had a time advantage, for those classes are actually one hour and fifteen minutes long. The time factor aside, I believe the computers, which seemed to motivate my students, contributed to the final-exam results. First this happened, I believe, because the computer, the typed words, placed on the blue screen and later printed, helped give students something that the actual writing does not — objectivity. There is something amazing about being able to see your words, your thoughts, mechanically reproduced and processed. This alone, I believe, gives students the confidence that helps them do well. Using *Microsoft Works* in the classroom, then, is and was a way of helping students to pass their final exam.

Monitoring the Study

Students used CSR and *Practical Grammar* in this course. The grammar software (and this has been my contention all along) is not as developed as it needs to be. This, I believe, is one of the main problems with the SYNERGY class; the grammar software does not meet the needs of our students. This is what demands the utmost attention. It is imperative that the grammar software include units that can help students actually improve their skills. In particular, I am referring to the fact that the grammar software is limited to the basics. Our students need to have access to software that includes fragments, run-ons, phrases, as well as ESL units on prepositions, diction, and usage. We are simply not equipped to deal with the needs of our students if the grammar software does not include areas that are crucial to their being able to express themselves in standard English. Though we can implement new strategies and materials that we, as teachers, have, the students will not get all the benefits of this technology unless it is geared to meeting their needs. Additionally, it would also be a plus if the software that students used in the lab portion of the course were different than the software for the classroom; this way, we wouldn't overlap or kid ourselves about how well our students are doing.

Outcomes

The performance measure of the class is the percentage of students in each of the grading categories: Satisfactory (S), Progress (P), or Unsatisfactory (U) and Withdrawal (W). The larger the percentage of students in the higher categories (such as S) the better the performance of the class. Another factor that is significant in any class performance is the completion rate. Usually, the higher the completion rate, the better since more students are retained and this might mean that some of the students who stayed throughout the course might have acquired the necessary skills even if they failed the class.

Although my control group was a very good class, in terms of the grade averages and the general student participation, my experimental group had better results. The departmental exam (the final exam) is used as an exit criterion to determine if students are actually prepared

for introduction to composition or ENC 1130. As for the results, more students from the computer-assisted ENC 0020 SYNERGY class actually passed the final exam and went on to ENC 1130, Introduction to Composition. Table I shows the final-grade distribution for both groups. All the students in the experimental group had either a satisfactory grade or progress. It is also interesting to note that no students withdrew from both classes, but the control group had students (8%) who had unsatisfactory grades. These are generally students who failed to complete required assignments.

Table I
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental (N=19)	58%	42%	—	—
Control (N=24)	54%	38%	8%	—

Recommendations

I enjoy teaching computer-assisted SYNERGY classes. I would, however, like to see the following changes, for I feel that the students could greatly benefit from a few additions and implementations.

- Find more software that is compatible with our objectives.
- Involve more faculty members in software development and implementation. This will help to ensure that both their teaching styles and maybe students' learning styles could become a focal point in software development with faculty-selected objectives for their classes.
- Maintain on-going faculty training in the effective use of computers and software for teaching.

Wendy Jo Ward has been teaching developmental writing full-time at Miami-Dade, Wolfson Campus, for a year and a half. She holds a B.A. in English and an M.Ed. in English Education from the University of Florida in 1991 and 1993 respectively.

The Setting

About the Course

ENC 0020 is a developmental class that provides students with a foundation in grammar, usage, mechanics, and paragraph structure. Although the four credits for this course do not count toward graduation, students must take this class before taking ENC 1130 and core English classes if they have scored between 21 and 30 on the MAPS or between 48 and 77 on the CPT or if they passed ENC 0002 with a satisfactory grade. Along with the regular classroom sessions, students attend the Multi-Skills Lab for additional work with a lab instructor.

About the Students

Like many Miami-Dade students, the students in ENC 0020 have several challenges to face.

Many come from other countries and speak English as a second or third language. Moreover, they must often work full-time and take care of children while earning a college degree. Teachers must try to motivate these students while giving them the foundation they need in basic skills.

About the Software

The students used the CSR modules in the lab with their lab instructor and used *Microsoft Works* for writing with me. The CSR course drills the students in the grammar skills covered in class, skills which the students are tested on for the midterm and final grammar exams and which the students are expected to apply to their writing by the completion of the course. See pages Appendix D for further software descriptions.

I liked using the *Microsoft Works* program with the students because they could revise papers quickly. Often students see rewriting as a chore, but the students in the computer-assisted classroom did not mind making corrections when they knew they could just insert words and punctuation marks or delete them and then get a neat new draft in just a few minutes.

My Expectations

When I gave my students a diagnostic grammar test, both the experimental and the control groups received the same average score of 64%. This told me that, in general, the students were at the same level. However, my experimental group had only thirteen students in it while the control group had twenty-five. The smaller class size, I felt, might affect the outcome since I would be able to spend more time in class with each student individually.

Monitoring the Study

My experimental and control groups had the same number of students drop the class and not show up for their exit writing exam.

In the control group, four students either dropped the class or were dropped from the class. One student dropped to join the military, one student never came to class at all, and two did not inform me why they dropped the class within the first half of the semester. Despite receiving 88% on her midterm grammar exam, one student disappeared shortly after the midterm without contacting me. If she had stayed in the course until the end of the semester, I feel she would have passed the class based on her grammar scores and writing performance in class.

In the experimental group, four students also dropped or were dropped. One student never came to class at all, two informed me about conflicts with their work and school schedules, and one stopped coming in the beginning of the semester and did not give a reason for his nonattendance. As with the control group, one student did not take either the final grammar or the essay exam, even though he received a score of 84% on the midterm grammar exam and even though he probably would have passed the final writing exam. However, unlike the student in the control group who stopped coming to class after the midterm, this student contacted me and told me that he had to spend more time with his family due to a crisis.

Outcomes

In this class, students must first take a grammar midterm and final exam covering fragments, run-ons, capital letters, pronouns, end marks, subject-verb agreement, standard English verbs, and irregular verbs and receive at least 80% on both tests to be eligible to take the final writing exam. In ENC 0020, this writing test consists of a ten- to twelve-sentence paragraph holistically scored by two readers on a scale from one to four based on criteria set by the department. To pass the class, students must receive at least a five out of eight on this writing exam, or at least a two from one reader and a three from another. See pages 49-50 for a description of the faculty rating scale.

If one were to look just at the final-grade results (as seen in Table I below), it would seem as if the control group of twenty-five students performed better than the experimental group of thirteen students. After all, 60% of the students in the control group passed the class with an "S" (or "Satisfactory"), but only 54% of the students in the experimental group received an "S." However, the results of the grammar and essay exams (shown in Table II and Table III) indicate that the students in the experimental class who actually stayed in the class until the end and took the exams performed better than the students in the control group.

In the control group, twenty-two students took the grammar midterm. The scores ranged from 80% to 92%, with the average score being 85%. Then by the end of the semester, twenty students stayed in the class and took the final grammar exam. Interestingly, there was a wider range of scores, from 76% to 94%, yet the average score remained 85%. Since the student who made 76% was not eligible to take the final writing exam and others stopped attending or withdrew, nineteen students took the final writing exam. Of those students, 79% or fifteen of the nineteen students passed the test with a five or higher.

In the experimental group, nine students took the midterm grammar exam. Most students scored higher than the students in the control group. The lowest score was 80%, the highest was 98%, and the average score was 88%. For the eight students who took the final grammar exam, the scores ranged from 80% to 100%, with the average score being 91%. Finally, for the writing exam, all but one student who took the test received a score of five or higher. Thus, 88% of the students taking the final writing exam passed.

Table I
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental Group(N=13)	54%	15%	—	31%
Control Group (N=25)	60%	20%	4%	16%

Table II
Grammar Exam Scores

Group	Average Diagnostic Score	Average Midterm Score	Average Final Score
Experimental Group	(N=12) 64%	(N=9) 88%	(N=8) 91%
Control Group	(N=24) 64%	(N=22) 85%	(N=20) 85%

Table III
Final Writing Exam

Group	Scored 5 or Higher
Experimental Group(N=8)	88%
Control Group (N=19)	79%

In ENC 0020, students receive U, P, or S grades. The student in the control group who left the class shortly after the midterm without contacting me received an "Unsatisfactory" grade because even when she attended class, she did not turn in most of her homework assignments. The student in the experimental group who did not take the final grammar or writing exams but who contacted me received a "Progress" grade because, when he came to class, he participated and turned in all but one homework assignment. Finally, the student in the control group who did not pass her final grammar exam along with the students who did not receive at least a five out of eight on their final writing exams received a "Progress" grade and must repeat the class. The students who first scored at least an 80% on the grammar midterm and final exam and then at least a five out of eight on the final writing exam received a "Satisfactory" grade, making them eligible to take ENC 1130, the next English class.

Recommendations

There are benefits to using computers to assist College Prep students. The students told me that they saw the computers as an extra resource and learning tool to complement classroom instruction and the textbook. I also observed that they started their writing faster. They did not write line by line and look for errors as they wrote. Instead, they got their thoughts down, printed their papers, and then revised them. In other words, they seemed to see revision as part of the writing process and did not mind making changes to their writing beyond correcting grammar and usage errors.

Perhaps the next step is to discover whether the students' attitudes about writing change from the beginning to the end of the semester. If underprepared students can leave ENC 0020 with a more positive attitude toward writing than they came in with, then using the computers should be encouraged and more students should be able to use computers for their writing assignments.

Homestead Campus

Judith Schurger was among the founding faculty at the Miami-Dade Homestead Campus when it opened in August of 1990. She presently teaches both college-preparatory and college-equivalent reading and writing courses, in addition to serving as a principle facilitator in developing and coordinating the campus' college-preparatory program. She received both a B.A. (1980) in English, with emphasis in Linguistics, and a M.S. in TESOL (1983) from Florida International University, where she was on the faculty of the English Language Institute from 1983-1987. She is a recent recipient of an NEH minigrant to develop multimedia instructional modules designed to support reading and writing across the disciplines.

The Setting

Given that remedial/developmental writing students (1) need as many opportunities as possible to communicate in writing; (2) often dread having to communicate in writing; (3) need and want immediate feedback and response to their writing; and (4) as potential college students and/or employees/ers, need to be computer literate, I decided to try a computer-assisted approach in one of my college-preparatory writing classes in hopes that using this approach would, in part, address these issues.

Essentially, I felt that using the computer as a system for group interaction and learning would provide more opportunities for written communication and create an environment in

which communication was meaningful and direct, and response, either from the instructor or peers, was immediate.

Besides the interactive aspect, using the computer as word processor would give students a chance to develop necessary computer skills, which they could immediately benefit from since many of these students were already in the workplace and since a good percentage might not articulate into the college-equivalent program. Additionally, "writing" on computer would give a more "professional" look to student papers; I hoped that their pride in their work would be positively affected and, subsequently, their motivation, not only to improve the presentation of their work but also to improve the quality. Often, the work turned in by my remedial students was sloppily written on rag-tag, wrinkled paper. This belied the problems many of these students had: low self-esteem from years of failure, which led to a lack of pride and motivation. In addition, many students were not aware of college/professional standards/expectations.

Additionally, I had always hoped to make the classroom more student centered but frequently found it difficult, especially with my remedial students, who saw learning as outer/teacher directed and passive rather than inner/self directed and active. Making students aware of their responsibility and control in the learning process, I felt, was essential. I suspected that retention would be positively affected as a result.

The computer-assisted classroom promised to be a quantum leap forward in meeting these academic, behavioral, and affective objectives.

About the Course

Two sections of ENC 0020, the second of two college-preparatory writing classes, were used in this study. The basic objective of this course is that the student produce a well-developed, well-organized paragraph (about 150 words) with a well-focused/limited main idea (explicitly stated in a topic sentence); with relevant major points developed by specific, detailed minor support; and with well-constructed sentences.

This course also has a lab component, i.e., students are expected to complete lab assignments designed to support the GPU (grammar, punctuation, usage) objectives at the level of recognition and limited production. A variety of modalities — software, video and audio cassettes, worksheets — is used. The number of hours per week or semester is not specified; each student is required to put in the number of hours necessary for him/her to satisfactorily (80% mastery) complete the assignments. In order to move into the next course, ENC 1130, students must (1) complete all lab assignments; (2) pass the final, timed in-house writing exam by demonstrating GPU and paragraph-development skills; and (3) attain an overall course grade of 75%>.

About the Students

Enrollment in the college-prep writing classes is typically lower and attrition higher during the Winter Term, when this study was undertaken (January-April 1994).

The control group began with nineteen students. In terms of retention, thirteen students remained by semester's end. Of the six withdrawing, one (who, in previous semesters, had a history of irregular attendance and withdrawal) left about a quarter of the way through the semester; one withdrew halfway through the semester because of a new job and family problems; and four left because they found the course more demanding (especially in terms of time needed for assignments, etc.) than they had anticipated — two about a quarter of the way through the semester and two just before the official college-prep drop date. The experimental group began with sixteen students (officially seventeen, but one was a no-show). As for retention, nine students remained at the end of the semester. Of the seven students withdrawing, four were advised to enroll in the ESL program; since our campus does not have a program and it was a burden for these students to travel to the Kendall Campus to attend ESL

classes, they continued in the course but eventually withdrew. Of the others, one student was involved in a serious car accident so had to withdraw. Also, two students left because of the unexpected workload in the class; one of these stayed until the official drop date because, even through he knew he was not keeping up, he admitted learning a lot and enjoying the computer-assisted class periods!

Given the above, it would seem that retention in the experimental group was better, although true statistical significance cannot be determined.

The Design

The lab component for both the control and experimental groups was undifferentiated. Lab assignments are typically drawn from a variety of computer software, including selected CSR modules, instructional videos and audio tapes, and worksheets. Classroom instruction focuses on integrating the GPU competencies reinforced in the lab into the writing process. The difference for this study lay in the use of *Realtime Writer* (RTW), *Word Perfect*, and *Writer's Helper* with the experimental group, both in class sessions and for homework assignments.

Over the course of the semester, the experimental group met in the computer lab a total of twelve times.

This study compares (mostly qualitatively) the two groups in terms of progress over the semester, exit proficiency, retention and changes in student perceptions about writing.

Monitoring the Study

The control and experimental classes had the same lab, text, journal, and other writing assignments. The differences between the two sections lay in the use of RTW for the peer-interview project and some textbook group exercises, and in the use of *Word Perfect* for four writing assignments and two proofreading exercises in the experimental class.

In the control group, I used my usual method for the above. The classmate interview was oral and the paragraph of introduction, based on the interview, was orally presented. Textbook exercises, for example in writing topic sentences or narrowing topics, were done at home or in the classroom and then discussed in groups. For practice in proofreading and editing, student writings from past semesters were introduced first; groups of three students worked together to make improvements on a piece of writing. I would collect the final product from each group and put their edited drafts on an overhead transparency. The next class period, I would display them on the overhead projector, and, as a class, discuss the edited version produced by each group. After three of these sessions, I would have the students move into peer evaluating of their own writings.

In the experimental group, RTW was used for the classmate interview. However, as in the control group, the paragraph of introduction was orally presented. Textbook exercises such as evaluating topic sentences and outlining paragraphs were also done on RTW in groups of three or four on the same channel. The proofreading exercises using sample student writings from past semesters were done on the word processor. The writings were loaded onto the hard drive; students brought the texts up, made revisions, copied onto their disks, and then printed out a hard copy, which I copied and distributed for class discussion. The latter process of pointing out, copying, and distributing was also done for peer evaluations of their own writings.

Outcomes

Student progress during the semester was qualitatively measured in three areas: (1) thoroughness in exploring topics (prewriting) ; (2) promptness in meeting assignment deadlines; and (3) neatness in presenting work. It is assumed that the above also provide a measure of overall motivation.

In terms of thoroughness, I found that students in the control group focused more on prewriting activities, such as clustering, freewriting, jotting, than did the experimental group. The experimental group were not limited to using the computer for these brainstorming activities; however, their prewriting efforts both on paper and on computer were not as extensive as in the control group.

As for meeting deadlines, the experimental group were more likely to get work in on time, even when they had the extra task of getting to a computer on campus to do their assignments (most did not have computers at home). An exception to this was in meeting the deadline for the student interview project. Students usually begin the interviews in class but continue them outside of class, either in person or over the phone. Those in the experimental group often had difficulty finding a mutually convenient time to meet in the Learning Center to continue their work. In addition, students complained that they would make appointments with their partners only to be "stood up." In these cases, I gave students the option of completing the interviews by phone.

Of course, the overall presentation of assignments improved significantly in the experimental group. This improvement was measured not only in appearance (no more crumpled, rag-tag papers) but also in format. Unlike students in the control group (and students in my classes generally), these students always included the necessary information in the required heading, put papers showing work at various stages of writing in the required order, and even included artistic embellishments or drawings. Not only was this improved presentation helpful for me (no more puzzling over poor handwriting or wondering which assignment I had in hand or which section of which class it was from) but students seemed much more eager when it came time to exchanging papers for peer evaluation. I could only attribute this positive attitude toward a process students usually dread to the pride inspired by professionally presented work. Students commented on how "beautiful" their finished products looked and were eager to have an "audience."

As for retention, approximately 24% of the students (four students out of a total of seventeen) in the experimental group should have moved to the ESL program as opposed to none in the control group. Of course, given such small enrollment numbers, the withdrawal percentages shown in Table I may be misleading. Only two students in the experimental group dropped because of the workload and time commitment demanded for the class as compared to four in the control group. This is interesting in light of the more demanding time schedule for those in the experimental group, since they had to get to campus more often to prepare assignments. However, as mentioned previously, considering such a small sample, statistical significance cannot be determined.

Table I
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental (N=17)	35%	12%	6%	47%
Control (N=19)	11%	42%	16%	31%

Final grade distribution is a bit more revealing. A grade of "U" in this course usually reflects a situation in which a student has had irregular attendance over the semester, has failed to complete major assignments, and has not attempted to contact me or seek my help after my attempts to encourage these. Only one grade of "U" was given in the experimental group as contrasted to four in the control group. The percentage of "S" grades is not as

revealing. Aside from the problem of small class sizes, several students in my control group who were progressing well either dropped or got grades of "P". These students could not meet the demands of school because of serious personal problems and heavy outside responsibilities.

Two surveys were done over the course of the semester to assess student perceptions of the writing process and of themselves as writers. The first survey the second week of class asked students, guided by specific questions and examples, to discuss their writing process. The results were similar to those in previous semesters: many stated that they started on assigned papers well in advance of the due date; worked in a "(quiet), clean, well-lighted place"; wrote multiple drafts...! Often, students rated "spelling" as their major weakness. The top rated strength was "creativity": they had great imaginations and could come up with "interesting stories." Most hated writing.

The second survey was taken at semester's end. This survey sought to ascertain (1) how students, having completed the course, now perceived their strengths and weaknesses; (2) what students would change about the class if they were designing it; (3) what they enjoyed, (4) found most important, and (5) found most interesting about the class. There was a noticeable difference between the responses of the two groups. Students in the control group focused more on the *process* of writing; they mentioned the importance of prewriting to thoroughly develop and focus a topic. Most complained about the workload. Comments on perceived strengths and weaknesses had changed. Being able to create interesting stories gave way to being able to develop a topic in more depth, more detail. Students in the experimental group tended to pay more attention to form/final product than to process: proofreading, writing strong topic sentences, organizing information within a paragraph. Most in the experimental group pointed to increased computer skills. All said that they enjoyed the computer-assisted classes. Again, surprisingly, only one student complained about the workload.

Findings and Insights

(1) Administrators and faculty must understand that the transition from the traditional, instructor-centered writing classroom to the non-traditional, student-centered computer-assisted classroom is no easy task.

(a) The process is extremely time intensive. Previewing software and programs being considered for use can be very time consuming. In addition, with little or no experience with computer-assisted teaching, previewing may do little to reveal just how effective a program/software will be or what the problems might be in the actual classroom setting with a student or groups of students. Trial and error, albeit frustrating, is often the only way.

(b) Instructors must be prepared to be flexible in designing syllabi or classroom activities since they may often find themselves having to adjust lesson plans because of unforeseen problems with the computers or with the programs/software.

(c) Unlike choosing textbooks, the computer programs an instructor uses may depend on (i) what has already been purchased by the college and/or (ii) budget. Also, the instructor will find that the number of programs designed to do what the instructor wants is extremely limited.

(d) Instructors and lab support staff should be sure to provide clear, detailed written instructions for the students on how to use a particular program or software. Even given this, much time is often spent in students' learning how to effectively use a program. When more than one program is involved, this can be a major time commitment given a one-semester period.

(2) *Realtime Writer*, although it provides a much-needed medium for group communication through writing, has several drawbacks.

(a) Students need to have assigned channels. If they don't, the work they do, if done in more than one session, is difficult to find. This is a problem because group membership is constantly changing.

(b) If students are assigned out-of-class work, the teacher station has to be brought up every time. This becomes a problem in a computer lab where many students and activities are going on at the same time.

(c) Sometimes there are problems in printing if the teacher station is not loaded correctly.

(d) Student work or other documents cannot be scanned or imported easily into the teacher window for testing or other exercises. Any document must be retyped directly into the program.

(e) It is difficult for students to learn how to "converse" in writing. The conversational visual cues are missing: this situation can be effective for learning but it can also be confusing and disruptive to the flow of thoughts.

(3) *Writer's Helper* may be inappropriate for lower-level writing students.

(a) In the prewriting section (which is all that I used in my study) topics are explored in more detail than can be managed at this level of writing/thinking ability.

(b) At the lower writing levels, this program is not user friendly; instructors must plan on actively guiding students through the activities and explicitly tying together the various prewriting strategies. In my case, I had planned on doing sample topics using this program in class by projecting the screen with an LCD. However, we encountered technical problems and I was forced to give the students an overview of the program and then run from computer to computer to guide individual students as they worked.

Students completed activities outside of class, but even with the help of the computer, the move from prewriting to outlining was more difficult for them than for those in my traditionally taught class.

(4) Word processing in general is a valuable tool for students at this level. *WordPerfect 5.1* proved manageable for the students. An ideal program would allow the instructor to look in on a student as he/she is composing; to take over a student's keyboard; to speak (orally) to a student or group of students; to send a student's work or a piece of writing to all students or a specific group of students; and to actually make written comment on a piece of student writing on computer (in the same fashion as when making comments on, underlining, or otherwise giving feedback on traditional pen-and-paper compositions). Various programs in conjunction with a word-processing program can facilitate some of the above; however, as would be expected, no one program can do all. Trying to find a creative solution to the above wish list should be one of the goals of future studies.

ENC 1130 in the SYNERGY Center

Kendall Campus

Abraham Oseroff teaches ENC 1130 in the College Prep Department at Miami-Dade Community College, Kendall Campus, where he has been teaching English since 1966. He helped start the developmental writing program in 1972, and has been working in it since. He has held his composition classes in computer labs continuously since the 1980s. Dr. Oseroff received his B.A. from the University of Pennsylvania, his M.A. from the University of Maryland, and his Ed.D. from Florida Atlantic University.

The Setting

The control group met in a traditional classroom twice a week; the experimental group met in a classroom for one session a week and in the SYNERGY Center for one session a week.

About the Course

ENC 1130 (college composition) students learn that an essay must make one main point (unity); be in some order (time, place, or importance); provide support for generalizations (stories, facts, quotations); and have standard sentence skills (grammar, spelling, punctuation, subordination).

Rationale for the Study

Word processing allows easier editing (fixing and moving text) than writing on paper. Writing using electronic word processing reinforces the concept of writing as a process, as creative rather than perfunctory, and as potentially collaborative as well as individual. Students appreciate close attention to their writing by an instructor. Coached while writing parts of an essay rather than after completing it, students avoid pitfalls and wasted effort. Ongoing coaching allows students to learn "during the game" rather than just before or after the event.

About the Students

Beginning ENC 1130 students think of writing as largely superfluous in a television/telephone age. Most equate narration with exposition — for example, writing their autobiography when asked to write an essay about themselves. Also, they lack understanding of the need to support opinions persuasively and the effort required to do so. They seem awed to learn that writing involves revision. They believe that an opinion can be supported with a generalization. "My mother is always there" or "My mother is always helping everybody" seems to them reasonable and sufficient proof that their mother is a caring person, despite lack of documentation. While most of the students know how to type, few have written essays on a computer.

About the Software

Please see Appendix D for a description of *WordPerfect 6.0 for Windows*.

The Design

Classes meeting Tuesdays/Thursdays were used in the study, with one section of ENC 1130

serving as the control group and the other serving as the experimental group. The control group received my usual methods of instruction, including the use of lecture, class discussions, chalkboard, overhead transparency, textbook assignments, mark-up of student essays, and small-group work. The experimental group received the usual methods of instruction in one class period a week and in the other class period worked in the SYNERGY Center on computers, either writing essays or doing instructor-generated assignments on unity, order, and support.

Monitoring the Study

In the classroom, students wrote independently unless required to cooperate; in contrast, in the SYNERGY Center, students wrote cooperatively, spontaneously helping each other with computer and writing problems unless required to work independently. With computer screens highly visible, they naturally glanced left and right to see how fellow students were progressing and shared comments about the assignments. Considerably more one-to-one conferencing during writing sessions was done in the computer lab than in the classroom, due to the ease of revising on computers.

Outcomes

As can be seen from Table I below, final grades were better in the experimental group than in the control group. Students adjusted readily to working in the SYNERGY Center, even those with little typing skill or no computer experience, thanks in part to the presence of a lab assistant working throughout each class period on problems or questions associated with the technology. Only rarely did students in the lab choose to write on paper instead of the computer.

Students who arrived early before class in the SYNERGY Center began immediately to work on their computers, whereas in the classroom, students who arrived early tended just to wait for the start of class.

Students' Comments on the SYNERGY Center

- "The first time at the lab I didn't even work on the first essay. I didn't feel too comfortable there. I met one of my classmates named Deirdre and found out that she was as lost in the class as I was. I got the hang of writing essays by calling Dr. Oseroff every time I was in doubt. As I got the hang of it, I would call him less each time. I have learned how to like writing essays. Now I tend to write more letters to my girlfriend in Boston. I like the fact that we can do revisions and fix the essay."
- "In the SYNERGY Center, our writing lab, our classes would meet almost once a week. We would do different assignments on the computer with our own saved disk. The primary purpose in the writing lab was to write essays. Dr. Oseroff gave us directions written in the computer on what to write and how it was to be set up. After writing a few essays, along with lectures and class participations, I understood what an essay generally was and what he expected from us."

Table I
Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental (N=23)	17%	22%	26%	13%	4%	18%
Control (N=25)	12%	16%	20%	12%	16%	24%

Recommendations

Results are far from conclusi that students learn to write better on computers than on paper. My impression, however, is that students who have the experience of a writing coach helping them revise as they write on computers get a better sense of the writing process than students who just turn in completed papers to receive marginal comments some days later for future revisions. As a teacher, I feel that recommending composing strategies to a writer using a computer is a far more reasonable intrusion than doing so to one using paper and correction fluid. Also, I find reading essays on a computer screen or from a laser printer much easier than reading handwritten essays.

Students take longer to get started on writing assignments in the SYNERGY Center than in the classroom. Rather than simply pulling out a piece of paper and starting to write on it, in the Center they must access the network and software, and retrieve a file from the network.

My recommendation is that ENC 1130 classes be much longer than fifty or even seventy-five minutes — perhaps several hours — and that they meet daily rather than only two or three times a week, to allow for computer familiarization and to provide opportunity for students to concentrate on completing a documented, revised essay at one sitting. In my next study, I have elected to compare classes meeting in the SYNERGY Center seventy-five minutes a week with classes meeting there a hundred minutes a week.

Wolfson Campus

Marjorie Sussman is an Associate Professor at Miami-Dade Community College, Wolfson Campus. She has been with the Wolfson Campus Communications Department for 8 years. She received her B.S. in Elementary Education from the University of Vermont in 1967 and her M.S. in Generic Special Education from Framingham State College in 1985.

The Setting

About the Course

ENC 1130, Introduction to English Composition, is the highest-level remedial writing course offered at Miami-Dade Community College. The course objectives focus on writing a standard three- to four-paragraph essay that is sufficiently developed and free of most mechanical errors. Students may test into this course or pass the prerequisite course, ENC 0020.

During the first week of classes all students take a diagnostic grammar test and a diagnostic essay sample to assure proper placement. The exit exam is a ninety-minute, three- to four-paragraph essay administered through controlled testing conditions. This exam is graded holistically by the English Department. Students must receive at least a 5 (out of a possible 8) to be eligible to pass the course. The actual final grade (A,B,C,D,F) is based on writing assignments, grammar quizzes and class participation.

About the Students

A total of seventeen students were originally registered for this course. Of these, 75% were

non-native speakers of English who exhibited a high degree of second-language syntax problems and mechanical errors. Two students dropped by the third week of class and one withdrew after midterm. Two students withdrew one week before finals. All the students who remained in the class and took the final passed the class (see Table I below).

Monitoring the Study

The class met three times a week in the SYNERGY Center. I employed a variety of teaching methods, which included the text, peer assessment, lectures and computerized instruction. (See Appendix D for a description of individual software programs.)

Through the use of Educational Testing Service's *GUIDES*, a diagnostic software, I was quickly able to get a "feel" for individual strengths and weaknesses as well as class strengths and weaknesses. I then used this information to modify my syllabus for the semester — refocusing my teaching strategies to meet the individual needs of this particular group of students.

About two to three times a month, I divided students into skill groups, working with one group (i.e., those students with deficiencies in writing thesis statements) while the rest of the students worked on *GUIDES* individually. As the semester progressed, and the students completed more of the diagnostic testing, I found I was able to refine my grouping, constantly regrouping as the need arose.

The students were also exposed to the CSR grammar program, but they seemed to feel it was below their ability level: as 95% consistently scored 100% on each pre-test, I tend to agree. The students did not work on this program willingly.

At the beginning of the semester all students chose to write their weekly essay on the computer using *Microsoft Works*, but by mid-term only three students were still using the word processor. The others found their lack of typing proficiency a detriment and chose to handwrite their essays.

Initially, I felt overwhelmed by the technology. With limited access to personnel who had computer expertise, I felt frustrated when the printer wouldn't work and/or the actual programs caused problems. I found myself limiting my classes' access to the computer. Students also appeared frustrated when the computer would not "do" what they wanted it to do. They had difficulty following directions for computer use, and I constantly had to monitor students individually to make sure they were using the program correctly. I felt as though class time for the first half of the semester was wasted as I tried to deal with hardware problems. Eight weeks into the semester we received direct help in the computer room — a part-time assistant. Even though he was only available once a week, his presence freed me to deal with teaching responsibilities, as I now had someone to deal with computer glitches. As I began to feel more comfortable, I began to increase computer usage.

Outcomes

Table I shows the Final Grade Distribution.

Recommendations

The SYNERGY Center is a great concept which, I believe, requires further study so that it can become an effective tool to aid our students in their acquisition of knowledge. I believe that the main reason for the negative feeling toward computer-assisted instruction was the lack of sufficient programs, sufficient support and typing proficiency on the students' part. As each of these issues is addressed and corrected, teaching in the computer-assisted classroom will be greatly enhanced.

The following are my recommendations for the this SYNERGY project:

1. The students need typing skills, either as a prerequisite or by having a keyboarding program available for their use.

2. I would like to have an aide in the computer room at all times to help deal with the hardware problems.

3. I would like to see classes available Tuesday and Thursday and not Monday, Wednesday, and Friday. The longer class period (1.25 hours versus 50 minutes) would allow for more in-depth work on the computer programs.

Table I

Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental Group (N=18)	—	17%	50%	—	6%	28%

Maria C. Villar has been a faculty member at Miami-Dade Community College for 2 years. She received a B. A. in French (1988) from the University of Florida, Gainesville, and an M. A. in Language and Foreign Studies (1993) from the American University, Washington, DC. She also holds a license in graduate translation from French to English, a certificate in Russian Studies, and a certificate in French Civilization and Language from the Universite de Paris, La Sorbonne.

The Setting

Two sections of ENC 1130 participated in the study. One section, the experimental group, had their classes in the SYNERGY Center, completed the entire *GUIDES* program and used *Microsoft Works* for their writing assignments. The *GUIDES* program was supplemented by the CSR writing modules that adds grammar support. The students alternated with *College Writing Skills With Reading* — John Langan's module — also available in textbook form.

The other section, the control group, met in a regular classroom without computers. Usual classroom teaching techniques were used to cover the same objectives. The only difference between the two sections was the use of computers by the experimental group. The same standards and policies were used in grading and assigning the final grades to students in both sections.

About the Course

The basic objective is for the students to be able to write a three- to four-paragraph essay on a given topic with relatively few errors in grammar, syntax and format. The topics chosen for the exams are taken from a bank of themes encompassing all styles of essays. The forms covered at this level are example, process, cause and effect, comparison and contrast, definition, narration and argumentation and persuasion.

The selections assigned in Langan's text, as well as copies of stories from other sources, are read, discussed and written on. The reading component of this class contributes to the course objectives; each reading selection is written in a definitive essay style.

The Design

Students in both experimental and control groups were required to take approximately eight quizzes administered in class and tabulated by Testbanking and Electronic Services. They were also required to take two departmental exams: a midterm and a final. Students' performance in both groups would be based on their scores on these exams.

The programs currently available, *GUIDES* and CSR, were being used as a complement to my regular classroom instruction. The computer-aided instruction was used once a week by the

experimental group; regular classroom instruction was used in the remaining two meetings. Therefore, the total number of CAI hours for the sixteen-week semester was between twelve and thirteen. The control group met three times a week in the regular classroom, where normal classroom instruction was used. The objective of the study was to determine if the combination of computer-aided instruction with regular classroom instruction would better assist the students in developing their writing process. Student performance on all the exams in both groups was to be monitored. Perhaps, if the percentages differed greatly for both groups favoring the computer-aided approach, I might try a class conducted solely with computer programs.

Monitoring the Study

I monitored progress for both groups. Students enrolled in the experimental group had no prior knowledge that they were registering for a course in which the use of computers was an integral part; therefore, incorporating *Microsoft Works* for their word processing was rather cumbersome. Out of a class of twenty-four students, only three could adequately type and use the keyboard in the time allotted for in-class writing assignments. Class time was fifty minutes. However, editing and revising essays was much easier for this group since they did not have to rewrite an entire paper. The control group adjusted much better to the fifty-minute writing requirement since they did not waste any time learning how to type or work with the computer.

About the Software

See Appendix D for a description of individual software packages.

Outcomes

In addition to the established curriculum, I also worked through an office on campus entitled Testbanking and Electronic Services, which stored all the data for my classes. This office renders a service I deem invaluable, not only to my traditional classes, but specifically to my SYNERGY class. All of my students' scores were stored and evaluated for me through the system.

At this point, I should discuss the method used in grading students' written material. This method is called holistic scoring, which is used at the middle and end of each semester for the midterm and final exams. Below is the operational description of the four-point rating scale which conveys the general, overall impressions a reader has of the essays he or she reads.

Score 1: Writer includes very little, if any, specific and relevant supporting detail but, instead, uses generalizations for support. Thesis statement and organization are vague and/or weak. Underdeveloped, ineffective paragraphs do not support the thesis. Sentences lack variety, usually consisting of a series of subject-verbs and, occasionally, complement constructions. Transitions and coherence devices are not discernible. Syntactical, mechanical and usage errors occur frequently.

Score 2: Writer employs an adequate amount of specific detail relating to the subject. Thesis statement and organization are unambiguous. Paragraphs generally follow the organizational plan, and they are usually sufficiently unified and developed. Sentence variety is minimal and constructions lack sophistication. Some transitions are used and parts are related to each other in a fairly orderly manner. Some errors occur in syntax, mechanics and usage. Score 3: Writer presents a considerable quantity of relevant and specific detail in support of the subject. The thesis statement expresses the writer's purpose. Reasonably well-developed, unified paragraphs document the thesis. A variety of sentence patterns occurs, and sentence constructions indicate that the writer has facility in the use of language. Effective transitions are accompanied by sentences constructed with orderly relationship between word groups. Syntactical, mechanical and usage errors are minor.

Score 4: Writer uses an abundance of specific, relevant details including concrete examples that clearly support generalizations. Thesis

statement effectively reflects the writer's purpose. Body paragraphs carefully follow the organizational plan stated in the introduction and are fully developed and tightly controlled. A wide variety of sentence constructions is used. Appropriate transitional words and phrases and effective coherence techniques make the prose distinctive. Virtually no errors in syntax, mechanics and usage occur.

All students in both groups had their midterm and final exams read by at least one of the faculty members of the School of Communications who have been through the holistic scoring workshops and training. A score of one through four was given by each grader. This process is done through codes so that the second reader is not influenced by the first reader's score. A student may receive a combined score as low as 2 or as high as 8. The passing score for the exam is a combined score of 5. Passing the departmental exam is the minimum requirement for all writing levels. This does not, however, mean the student will pass the course, for there are other requirements which include completing twelve writing assignments, passing ten quizzes, completing a class project and participating in class discussions. For this reason, if one evaluates the final scores of both the experimental and control groups, there may seem to be discrepancies between the scores and the final grades.

Evaluation takes place at various points in the course. First, when students enter the class, they are administered a diagnostic examination which consists of a grammar test and a written component. Neither exam, however, is used to average a student's grade. They are just indicators to the student, but most importantly to the faculty, so that they may know at which level a particular student and/or class stands. Therefore, the syllabus of a class may be changed by the instructor after reviewing the diagnostic results of the students. The faculty may opt to start reviewing first the areas where students seem to have more trouble. Thus, a class may end up on a different path from the actual lesson plans for the semester. This is usually done to accommodate the needs of the students and to make the class schedule flexible. This is what I do, and this is the basic rationale behind diagnostic testing.

Another evaluation is comprised of a series of quizzes and tests administered during the regular twelve- to sixteen-week course and pertaining to material taught and learned in class. Individual instructors may vary in this practice. Evaluation consists also of two departmental examinations which take place at midpoint and at the end of each semester. It is required that ENC 0002 and ENC 0020 students receive a minimum of 80% on the midterm exams. If they do not, they are given a grade of "P" (or "progress") which means they must retake the course at a later time. ENC 1130 is not given such an exam, but is given a written exam to determine the status and weaknesses of students at midpoint. All levels, once having adequately passed midpoint evaluations, are given a final exam which is holistically scored. If a student does not pass the final examination, he/she automatically must retake the course; the student cannot pass the class. Thus, discrepancies may arise since there may be instances when the student has been doing satisfactory work during the semester and fails the final. This student, unfortunately, will be given a grade of "D".

Table I shows the final grade distribution for both groups.

Table I
Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental N=24	—	21%	21%	33%	4%	21%
Control N=26	8%	38%	23%	19%	—	12%

Recommendations

I want to give the students a choice about whether they use the computer to compose and to write. It is challenging to get all the students to finish their entire writing assignment and print it out within the fifty-minute class period. I feel that we need more time in the SYNERGY Center to allow the students enough time to completely finish an assignment. I have structured my next study close to the design of the present one, so it will be interesting to know if the result will be about the same.

A final observation to make here is that the scores averaged and recorded under the testbanking service do not include scores received for writing assignments. Communications have begun, however, to devise a way of incorporating the holistic-scoring method used by the department into the testbanking computer; therefore, the averages will include writing assignments and not solely grammar quizzes.

REA 0002 in the SYNERGY Center

North Campus

Bob Ashcraft has taught reading in the Basic Communication Studies Department at Miami-Dade Community College, North Campus, for 5 years. He taught extensively in secondary schools in Miami, Florida, and Walhalla, South Carolina, as well as being posted for 3 years to a boarding school in East Africa (Kenya). He has a B.A. in history from Oberlin College in Ohio and an M.A. in Teaching (history) from the University of Massachusetts (Amherst).

The first opportunity to use the SYNERGY Center knocked at my door when the SYNERGY staff wanted *GUIDES* (the diagnostic test of ETS) to be evaluated. As I pondered the invitation, I realized that I had never used a computer or taken a computer course. I also realized that I did not want to remain totally ignorant of computers and their possibilities. After much debate within myself, I agreed to participate. To my surprise, I discovered that computers are not scary, and this discovery is mostly due to the assistance I received from Lonnie Pollard, who manages the North Campus SYNERGY Center, and Danny Ramos, his assistant.

The Setting

After my initial exposure to the SYNERGY Center, I began to consider its use for my students. I generally teach the second-level reading course (REA 0002) offered by the Basic Communication Studies Department. This course emphasizes literal comprehension skills (main idea, vocabulary in context, patterns of organizing action, and the like) along with the critical skills (inferences, fact and opinion, purpose and tone, and the like). About 60 to 70% percent of my students speak English as their second language, Spanish and Creole being their first. The median age approaches twenty-five years. By attending two class meetings per week in addtion to lab time, students labor to raise their reading level to at least a 10.5 grade level.

The Design

My goal was to use the SYNERGY Center in order to provide individualized attention and feedback to my students. As I began to explore the Center's software, I recognized more clearly than before my own inadequacies in understanding individualized learning programs and the intricacies of the software. Therefore, I added CSR next and PLATO later. At the beginning, I did not require students to complete a certain number of modules, nor did I keep close watch on what the students did and how they were progressing.

Over the four semesters that I've used the SYNERGY Center, I have come to require the students to spend a minimum of twenty hours in the SYNERGY Center, to discipline myself to read the software reports on students' progress, and to refer to these reports in class. I have also included students' participation in the SYNERGY Center in my computation of their course grades. I am pleased to note that the students using the SYNERGY Center have performed better than those using the traditional lab. The traditional lab employs student tutors and an array of reading booklets to reinforce classroom instruction and iron out

any confusion in the major skill areas. Some students prefer this type of lab to the SYNERGY Center because of the greater interaction between tutors and students.

Due to financial restrictions at the college, however, as well as the need to provide access to the SYNERGY Center to more students, we can require students to spend only ten hours in the lab. This change has required me to rethink my plan for students' use of the SYNERGY Center. Instead of looking at time spent in the SYNERGY Center, I am currently (Winter Term 1995) making certain assignments that the students have to complete.

Step one requires all to complete three of the five sections of the *GUIDES Diagnostic Reading Test* (Understanding Text, Words in Context, Prefixes-Suffixes). In class, I emphasize that they are not to work on the Follow-Up section at this time. Based on the results of the Understanding Text section, students work in the lab on skills that need improvement. This is step two. Students from my 8 a.m. class use the traditional lab during their free time under the guidance of one or two paraprofessionals. My 7 p.m. students work in the SYNERGY Center during open lab hours on assigned modules from the 1100 and 1300 series of the CSR program. Step three requires all students to return to the SYNERGY Center during the final lab week to complete a middle-level reading selection from the Follow-Up section of Understanding Text *(GUIDES)*.

Follow Up

I will compare the end-of term results with those of the beginning of the term. I hope to report the results in the next report of Project SYNERGY.

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The Setting

About the Course

REA 0002 is a college-prep reading class designed to elevate students' reading abilities to a 10.6 grade level or higher. The acquisition of skills (main idea, supporting details, vocabulary in context, etc.) is emphasized using the text, *Ten Steps to Improving Reading Skills*, by John Langan, supplemented with newspapers, magazines, poetry selections, and either a three-act play or a novel.

About the Students

Eighty-one multicultural students (thirty-one males and fifty females) enrolled in three sections. The ages ranged between seventeen and fifty-six with the majority of the students in their early to mid-twenties.

The Design

Three sections of REA 0002 were selected to participate in the study. One section (twenty-seven students), designated Experimental Group A, received a minimum of one hour and fifteen minutes of computer-assisted instruction each week in the SYNERGY Center using a combination of *GUIDES* and PLATO modules. Another section (twenty-nine students), designated Experimental Group B, received a minimum of one hour and fifteen minutes of computer-assisted instruction each week in the SYNERGY Center using a combination of *GUIDES* and CSR modules. The third section (twenty-five students), designated as the

Control Group, received a minimum of one hour and fifteen minutes of tutor-led small-group activities in the traditional Reading Lab. All three sections received identical classroom instruction delivered by the same professor following the same syllabus.

Student selection for the three groups was chance of registration dictated by student preference of day and time. Experimental Group A met on Fridays, 9-11:50 a.m., for classroom instruction and met in the lab on Mondays, from 8-9:15 a.m. Experimental Group B met on Tuesdays and Thursdays, 5:30-6:50 p.m. They attended lab at the same time on Wednesdays. The Control Group met on Tuesdays and Thursdays, 3:05-4:20 p.m., with lab sessions scheduled for the same time on Wednesdays.

The objective of the research design was to determine which, if any, of the three methods of lab instruction was more effective as a delivery system to supplement classroom instruction and meet individual needs (increased reading ability). The major instrument of measure was the departmental exam. The fifty-item objective exam tests students' mastery of reading competencies set for REA 0002. At the beginning of the term Form B of the departmental exam was administered to all students. As a post-test, students completed Form A of the departmental exam. The two forms of the test are as equal as it is humanly possible to make two exams equal without being identical.

GUIDES Reading and Study Skills Program, a computer-based system of assessment and instruction in language arts for college students in remedial and/or developmental courses, consists of five diagnostic units and corresponding follow-up units: Understanding Text, Textbook Reference Skills, Memory, Words in Context, and Prefixes and Suffixes. The materials selected from the PLATO curriculum (whose lessons are sequentially designed to reinforce skills previously learned) and from CSR Basic Skills (which provides a pre-test, reference to the next module or a tutorial that guides the student through a number of practice exercises, and a post-test) are shown below in Tables I and II. These modules were completed as time allowed after *GUIDES* work was done.

Table I
PLATO Modules

Modules	Description	Modules	Description
hr1g	Vocabulary: Meaning from Context	*hr2f*	Comparison & Contrast
hr1a	Identifying Main Idea I	*hr2g*	Cause and Effect
hr2a	Identifying Main Idea II	*hr3h*	Illustration / Example
hr1c	Locating Supporting Details	*hr3e*	Tone
hr2e	Chronological / Logical Order	*hr1f*	Inferring the Answer

Table II

CSR Level Three Modules

Modules	Description
R0812	Identifying a Literal Idea in a Paragraph
R0819	Determining the Implied Main Idea in a Paragraph
R0813	Finding Details in a Paragraph
R0814	Determining the Order of Events in a Paragraph
R0815	Identifying Literal Cause and Effect in a Paragraph
R0820	Identifying Implied Cause and Effect in a Paragraph
R0821	Identifying Conclusion and Generalizations for Paragraphs
R0826	Reading Tables, Schedules, and Bar Graphs

Traditional lab topics for the Control group included the following: Vocabulary in Context, Main Idea, Supporting Details, Transitions, Patterns of Organization, Fact and Opinion, Inferences, Purpose and Tone, Propaganda, and Argument.

Monitoring the Study

I attended all lab sessions in the SYNERGY Center with both experimental groups. I assisted students upon request and offered encouraging comments. Many students expressed appreciation for my attendance and support.

I randomly visited the control group in the traditional lab (every second or third session) and checked their folders of completed activities on a weekly basis when they were not in attendance.

During the semester, I collected data (printouts) from the SYNERGY Center weekly; consequently, I was constantly aware of what the students were doing and how well.

I made every effort to make certain that classroom instruction was comparable, yet allow for individual needs. Since a big part of student progress in REA 0002 is measured by a portfolio of student writings based on readings from the text, vocabulary acquisition, and a book report, I allowed equal class time for the three groups to work on their portfolios, including time to discuss the novel or play each had read with classmates who had read the same title.

Students were encouraged to discuss their lab experiences and ask questions.

A brief mid-semester anonymous survey (teacher-made) provided students the opportunity to evaluate the course and their progress, to make suggestions and recommendations, and to react to their lab experiences.

REA 0002 *Date*_____

Student Course and Self-Evaluation

Directions: Please complete the following statements with serious responses.

1. ***I could further improve my reading skills if I....***
2. ***My teacher needs to explain.....***
3. ***I wish my teacher would....***
4. ***The class would be more interesting if....***
5. ***My teacher is....***
6. ***Before the end of the semester I must....***
7. ***In Lab I enjoy....***
8. ***Lab work is....***

Outcomes

The primary goal in conducting this evaluation was to present identical classroom instruction to three sections of REA 0002 with varying lab requirements in order to detect if students in the electronic lab or students in the traditional lab made significantly greater progress. Variables such as age, sex, time of day, and length of time in college were not considered (however, a greater number of students in the control group were first-semester students). A comparison of the final-grade distribution in the two experimental groups and the control group appears in Table III.

Table III
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental A (N=27)	56%	33%	-	11%
Experimental B (N=29)	59%	28%	3%	10%
Control (N=25)	48%	20%	8%	24%

Overall the experimental groups (fifty-six students) registered higher percentages of "Satisfactory" and "Progress" grades and a smaller percentage of "Withdrawals."

The number of lab hours completed and the number of learning activities completed by both experimental groups and the control group were so nearly identical that further comparison was not justified. Pre-test scores for the control group were significantly higher than for either experimental group; however, post-test scores for the three groups were comparable. Clearly Table IV reveals that students in the two experimental groups made greater gains during the semester, but post-test scores reveal no significant differences. Table V charts the comparison of passing grade scores between entry and exit for the three groups

Table IV

Pre-test and Post-test Scores

Group	A	B	C	D	F
Experimental A (N=24)					
Pretest	—	—	18%	50%	32%
Post-test	—	18%	73%	9%	—
Experimental B (N=26)					
Pretest	—	—	10%	55%	35%
Post-test	—	20%	70%	10%	—
Control (N=19)					
Pretest	—	—	33%	40%	27%
Post-test	7%	13%	66%	7%	7%

Table V

Comparison of Passing Grade Scores Between Entry and Exit

Group	Pre-Passing	Post-Passing	Gain
Experimental A (N=27)	18%	91%	73%
Experimental B (N=29)	10%	90%	80%
Control (N=25)	33%	86%	53%

Portfolio grade distribution is presented in Table VI. These subjective grades are comparable and do not reveal significant differences.

The distribution of grades on the required fifty-item objective test on the play or novel read by students in the three groups is presented in Table VII.

Table VI

Portfolio Grade Distribution

Group	A	B	C	D	F
Experimental A (N=24)	21%	63%	8%	8%	—
Experimental B (N=26)	31%	38%	31%	—	—
Control (N=19)	31%	31%	27%	11%	—

Table VII

Distribution of Grades on Novel Test

Group	A	B	C	D	F
Experimental A (N=24)	21%	29%	4%	29%	17%
Experimental B (N=26)	25%	50%	10%	10%	5%
Control (N=19)	20%	20%	27%	13%	20%

The "D" and "F" grades on the novel read outside of class probably indicate that students only partially completed the assignment (a cursory reading of the fiction versus an in-depth study).

A consideration/comparison of the student survey completed at mid-semester reveals a great deal about student attitudes. Ninety-eight percent of the students in Experimental Groups A and B completed item seven (In Lab I Enjoy . . .) with a response that named "computer." Of the students in the control group, 80% did not complete the item. A total of 56% of the students in the control group completed item eight (Lab work is . . .) with the terms "boring" or "a waste of time," while only 4% of the students who attended the SYNERGY Center (the experimental groups) responded in a similar manner. The overall value of the survey, I believe, is not so much what the students said but the fact that they felt they had a voice in the educational process, that someone cared about how they felt and was willing to listen to their comments.

Observations

Of the experimental students in Groups A and B, 84% made outstanding progress in REA 0002, as compared to 68% of the students in the control group. This comparison reveals, at least to this instructor, that participation in the SYNERGY Center is a valuable instructional service which should be maintained and expanded. I predict that under the revised system of lab services recently instituted at MDCC-North — students choose the lab they wish to attend and select their own schedules — a large majority of students will opt to complete their lab requirements in the electronic lab.

GUIDES is a good program for college-prep reading students when supplemented by either CSR or PLATO. Both CSR and PLATO are essentially electronic workbooks that provide practice of skills. I did not prefer one to the other prior to the study, and I found no evidence during the semester that using one is more advantageous to the teacher or student than using the other.

Our 1990's students are expected to function on the crest of the "Third Wave" – the technological society. I believe that in the Basic Communications Studies Department we can best assist them to prepare for an uncertain future with greater access to computers with more comprehensive software which will surely be available in the next few years. In fact, I am firmly convinced that every classroom should be stocked with computers so that each student can work for at least fifty percent of class time on computer-assisted reading, which would no doubt greatly improve reading skills and stimulate a lifelong interest in reading.

Kendall Campus

Azalee W. Glenn, Professor of Reading, has been teaching full-time at Miami-Dade Community College, Kendall Campus, for the past 26 years. She has taught both developmental and college-level reading courses. She received her B.A. in Education from Benedict College, Columbia, South Carolina, and her M.A. in Reading from Atlanta University, Atlanta, Georgia.

The Setting

From the beginning of the Fall Term 1994 (August-December), students enrolled in two classes of REA 0002 were given instruction in the Basic Comprehension Unit. This unit is one of four units taught in REA 0002. I was confident that through the mastery of this unit

they would be equipped to handle selected reading passages with relative ease.

Rationale for the Study

After working with both classes for approximately one month, I selected one of the classes to be used as the experimental reading class for Project SYNERGY. The other class was selected as the control group. I chose the two classes based on the similarities of their schedules, meeting times of Monday, Wednesday and Friday, and the meeting period of only two hours apart.

Of the two sequences, empirical evidence seemed to indicate that the control group was more serious and more energetic in going about their class activities. They were also diligent in completing their homework assignments.

Since the experimental group appeared to present more of a challenge to me, I decided that an innovative approach would be beneficial for them. When I discussed the possibility of using the computer as an alternative reading approach, the experimental group reacted with doubt and stated that they would not feel comfortable using a computer for classroom assignments. Many of these students said that this would be a first-time experience of using a computer. However, the class ultimately agreed to try the experiment. The students' fear of difficulty in using the computer never materialized. They did not have any problems with the mechanics of using the computer.

Both groups, the control and the experimental, were required to attend the College Prep Reading Lab. In this setting, they spent three to four hours per week working on lab assignments. These lab assignments were designed to coincide with their classroom objectives.

About the Software

The Quantum Reading Series: Level J, developed by EDL, was chosen as the beginning software program. This series was designed to build vocabulary and reading fluency by using high-interest stories. Every week the experimental group spent their Wednesday class period in the SYNERGY Center; the control group attended their class periods on Monday, Wednesday, and Friday as usual. The control group was given supplementary material to complete in class. This material was carefully selected to serve as reinforcement of a particular reading skill, whereas the experimental group read stories and answered questions that tested comprehension and vocabulary skills in general during the SYNERGY Center period. Meanwhile, most of the experimental students completed Level J and proceeded to Level K. A few of the students even progressed to Level L.

As a personal experiment, I selected two students to switch from *Quantum* to the *Learning Plus* software program developed by Educational Testing Services. This switch occurred after two weeks of using *Quantum*. These two students were selected because I wanted to find out if the nature and scope of *Quantum* compared favorably with *Learning Plus* and to determine if this program would be beneficial for an entire class.

Learning Plus tended to be more time consuming than *Quantum*. Additionally, *Learning Plus* contained many screens and windows that demanded more attention in following directions than *Quantum*. Both students enjoyed using *Learning Plus* even though one student stated that she would not recommend the program to be used by the class because of the time factor. Incidentally, both of these students passed the reading course. For a more detailed description of these programs, see Appendix D.

Monitoring the Study

The Project SYNERGY students revealed that using the computer to read served as a motivational factor. Periodically, as a further comprehension check, I asked them to write a reaction to a story of their choice. This allowed the students to identify with the story by reacting to a particular character or event in it.

The experimental group felt privileged that their class had been picked for the software

implementation project. Some students even revealed that they had noticed increased interest in reading since becoming a part of this SYNERGY project.

Outcomes

In reviewing the performance of both classes, it appears that there was no significant difference insofar as the success and progress outcomes are concerned. Table I below shows the performance of students in both experimental and control groups. In order for students to receive the "S" grade they must pass an exit exam as well as complete classroom assignments. Of the students receiving "S" grades, the control group received 36% and the experimental group received 22%. There was no significant difference in attrition between the two groups.

As the semester began to draw to a close, I noticed that the experimental group started to exhibit several of the positive study habits that I observed at the beginning of the semester from the control group. The experimental group expressed their appreciation to me for the opportunity of being involved in Project SYNERGY.

For Winter Term 1995 (January-April), I selected two REA 0001 classes for a similar comparative study. Having become more familiar with the SYNERGY environment and the software, I made some changes both in both the number of times the students would use the SYNERGY Center and in the software. The students would be exposed to other software that was not available for the REA 0002 students. It will be interesting to report what impact these changes have on attrition, success rate, participation and attendance for the experimental group.

Table I

Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental (N=27)	22%	48%	11%	19%
Control (N=25)	36%	40%	12%	12%

Homestead Campus

Fred Wolven has been a faculty member at Miami-Dade Community College for 11 of his 35 years in education and has some 16 years of work in community colleges in Michigan. He has served in leadership roles in developmental programs, developing curriculum, and has reviewed software and written testbank questions for Project SYNERGY.

The Setting

Students in development studies REA 0002 either test directly into the course or pass into it from REA 0001 with varying skill proficiencies and deficiencies. These REA 0002 students enter classroom instruction simultaneously, and they are also scheduled into the Learning Skills Lab activities commencing the first week of the semester.

Although students advance at varying paces with varying levels of improvement, they are all

expected to complete lab work, which complements their classroom instruction, with nearly the same speed. We know this is unrealistic even for students who may spend additional time in lab activities beyond the basic requirements. Change in this situation was made in the first phase of this experiment because in the normal classroom, instruction is impeded, student progress is hindered and limited, and frustration is a continuing condition for students, lab tutors, and the class instructor.

The Design

During the first term of this experiment we discovered that students in the experimental group showed a marked increase in success, and there was a significant decrease in student withdrawals from prior terms (see Table I).

Table I

Final Grade Distribution vs. Prior Terms

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental Group (N=24)	46%	17%	29%	8%
Prior Terms (N=279)	20%	40%	10%	30%

In the experimental group the drop/withdraw rate was reduced from prior terms of nearly 30% to 8%, while the success rate of students achieving satisfactory advancement during the term increased from 20% in prior terms to 46% in this group.

As reported earlier, having determined these things, Ms. Carol Dietrick, the SYNERGY Center Manager, and I pre-selected for the first-term experiment the Level 3 CSR modules (a set covering word meanings, main ideas, details, order, et al.), and having found that too basic a level, in the second term of the experiment we switched to Level 4 modules. Also we used the CSR diagnostic tests to prescribe the module work students would need.

Implicit in the experimental group set-up was having the class begin the term in the SYNERGY Center to continue efforts to assist students in remediating their serious deficiencies prior to their moving into a more traditional classroom situation. During this early work, the professor joined the lab personnel in assisting students as they progressed through the programs. A bank of five computers (networked with those in the SYNERGY Center) were installed in the professor's classroom adjacent to the lab; this provided not only additional stations but the opportunity for continuing use by students once they completed the CSR module work and entered the more traditional classroom portion of the term.

As the experimental students completed CSR activity, they entered a very individualized program progressing at their own pace throughout the remaining two-thirds of the term. This was then followed by a more uniform traditional classroom concentration on text content.

The control group, as in the first term of this research, continued to use the Skills Lab/SYNERGY Center and CSR modules only as necessary (upon referral) throughout the term, but essentially they completed a more traditional class with the lab work as a supplement. Both groups did vocabulary skill building on a continuing basis throughout the term; this work was student-directed and lab-focused.

In the second term, the goals for the experimental group were evaluated to determine if the dropout rate would continue to be reduced, the course completion rate to be increased, the failure rate to remain under 10%, and the success rate (progress made and/or satisfactory achievement earned) to continue at

or above 65%. Further, the Nelson-Denny was selected and used as the course exit test (for both groups) to provide a more valid grade-level achievement measurement.

Outcomes

In the second term of the experiment students continued to enter both the experimental and the control groups based on their college entrance placement scores, but we found that the text-related diagnostic test of each group administered at the start of the term was inadequate. In all future terms in both groups, the Nelson-Denny test will be used as both a pre-test (diagnostic) and post-test (exit) to ascertain more reliable reading level. Further, as indicated above, with the experimental group, students took the CSR Level 4 diagnostic tests to determine number of modules to be worked. We have found that nearly all students need to complete all modules in each of the CSR program areas no matter what the diagnostic results indicate. This is so because most of the CSR diagnostic tests are too brief to cover all of the basic skill areas and probable deficiencies.

Further, based on work the experimental group students did with CSR Level 4 modules, wefound that this level contained an inadequate amount of activity for what most students required. Therefore, in the next term students in this group will be assigned CSR Level 5 modules, depending upon the degree of difficulty they experienced while completing the Level 4 work and also their needs as determined throughout the remainder of the term.

Included in the second-term study was an examination of the amount of time students spent on task (CSR modules) and percentage completion of modules in relation to testing. Please see *Figure 1: Number of CSR Modules Passed and Final Grade* and *Table II: Percentage of Assigned CSR Modules through CSR's Diagnostic Tests.*

Table II
Percentage of Assigned CSR Modules through CSR's Diagnostic Tests

% Completion	Satisfactory	Progress	Unsatisfactory	Withdrawal
80-100	40%	23%	13%	—
70-79	—	10%	—	—
0-60	7%	—	—	7%

It can be deduced from Figure 1 and Table II that those students who completed 80 to 100% of the modules prescribed by CSR's management system performed better. While further consideration needs to be given to determining how to effectively assist the students who complete their prescriptions, it seems that the amount of time the student spent in CSR activity did not influence how they performed either in CSR or in the course. But Table II shows that 40% of the students who completed at least 80 to 100% of the modules prescribed, regardless of the amount of time it took them, earned satisfactory grades. Figure 1 shows the number of CSR modules passed and the final grade for students in the experimental group. We need to determine how to monitor both the amount of time students utilize and the exact lab activity they are engaged in to seek further correlations between need, activity, effort, and result.

Figure 1: CSR Modules Passed and Final Grade

From the first term's study we recognized the need to redouble our efforts to meet the needs of the weaker students (in the experimental group) while also realizing that some of these students needed a consecutive term of study in order to achieve basic competency in the course.

A couple of observations are in order. Not only did the experimental group (thirty-two students) and control group (thirty students) contain nearly the same number of students (in the first term of the study the experimental group had twenty-four while the control group had only fifteen), but there did not seem to be as wide a difference in deficiencies between the experimental and control groups (there was a 10% greater number of students in the experimental group with weaker backgrounds in the first term).

Further, unlike the first-term study in which both groups registered nearly identical success rates (63% and 67%) and withdrawal rates (8% and 7%), in the second term, there were differences between the experimental and control groups both in success and withdrawal percentages (see Tables IV and V). The experimental group enjoyed a 78% success rate (progress made or satisfactory grade obtained) with only a 6% withdrawal. On the other hand, the control group had a 70% success rate and a 3% withdrawal (see Table IV). Also, between the first and second terms (in the experimental group), there was a more marked improvement in lowering the unsatisfactory rate from 29% to 13%, and the retention improved slightly with the withdrawal rate dropping from 8% to 6%.

Table III
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal	Incomplete
Experimental (N=32)	44%	34%	13%	6%	3%
Control (N=30)	47%	23%	20%	10%	0%

It is also interesting to note that, just as there has been both an increase in the percentage of students (in the experimental group) achieving success and a corresponding decrease in the number of student withdrawals from prior terms (before the first term of this experiment) to the first term, and from the first to the second term, there has also been an increase and improvement in the control group from the first to the second term (see Table IV). It should be noted, though, as Tables III and IV indicate, that there is an increase in the numbers of students making progress rather than earning the satisfactory grade this second term, over the first, in both groups. This is due in part to our using the Nelson-Denny as an exit test. We realize that while we have reduced the unsatisfactory ("U") percentage to 29% in the first term, and then to 13% in this second term, our goal of reducing that to 10% remains the target for the third-term experimental group (Table III).

Table IV
Final Grade Distribution: Experimental Groups

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal	Incomplete
Experimental (N=32) 94-1	44%	34%	13%	6%	3%
Experimental (N=24) 93-2	46%	17%	29%	8%	0%

Table V
Final Grade Distribution: Control Groups

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Control (N=30) 94-1	47%	23%	20%	10%
Control (N=15) 93-2	60%	7%	27%	7%

Observations

Based on continuing feedback from students, we find that their interest in using the SYNERGY Center and materials is a factor in their staying in class whatever their final course evaluation may be. The improved retention rates reflect this.

Also true seems to be the point that starting their term in the electronic classroom with the remediation work, the experimental group did achieve higher success rates and lower dropout rates than the control group.

Having improved Skills Lab/SYNERGY Center support activities and the classroom drill exercises and tutoring assistance available throughout the term, we are able to focus more effectively on aiding those students tending to not attain either a "P" or an "S" evaluation within one term. These concentrations are especially significant for the high number of adult learners enrolled in developmental studies.

We continue to be an excited part of the learning innovations which the electronic classroom provides in a rapidly changing and advancing technological era with its improvement of education and delivery of the same.

ENS Courses in the SYNERGY Center

Kendall Campus

Sharla Jones is a professor of English as a Second Language at Miami-Dade Community College, Kendall Campus. She has been with the Kendall International Students Program for 8 years. She received her B.A. in Spanish at Spelman College, Atlanta, Georgia, in 1978; M.A in Spanish at Middlebury College, Middlebury, Vermont, in 1979; M.A. in International Affairs, California State University, Sacramento, California, in 1987; and M.S. in TESOL (Teaching English to Speakers of Other Languages), Florida International University, Miami, Florida, in 1990.

The Setting

About the Course

ENS 1241L is a Writing Lab course for Non-Native English Speakers in the International Students Program. The course provides additional support and practice for ENS 1241 Writing, a co-requisite. ENS 1241L is the third-level course of a six-level program. Students are placed in this course depending on their Michigan Test Score or having previously passed beginning Level 2 Writing. Each level lasts sixteen weeks. However, accelerated and intensive courses are offered so that students can complete the courses in eight weeks.

About the Students

The twenty-one students enrolled in this course possessed a wide range of educational backgrounds from high school to graduate level. Except for one Vietnamese, all the other students in this course came from a primarily Hispanic background. Their ages ranged from eighteen to fifty years.

The Design

During the Summer Term of 1993, I taught a Level 3 course, ENS 1241L Writing Lab, for the International Students Program. The class met Monday through Thursday for six weeks. The course was instructed using regular classroom methodology (teacher/student activities, books, handouts, overhead projector, blackboard, homework, tests and written assignments). In addition, we used the ESL computer lab once a week and the Center for Teaching and Learning lab only once during the entire term to enhance classroom instruction.

From daily observations, I noticed that in the ENS 1241L summer session, the students sometimes had difficulty comprehending required material within a regular classroom setting and the course seemed tedious. On the other hand, the students seemed enthusiastic about learning on the days we used the computer lab. The students performed well on tests after having studied the required material sufficiently, and feedback was given within a day or two. This discussion prompted me to seek ways of incorporating more technology in the classroom. I began to ponder if the level of interest that most of these students showed on the days that we used computers could be retained if we were to use computers more often, and how this shift would affect their attitude and performance in other areas where computers may not be used.

Thus, for the Fall Term of 1994 (August-December), I wanted to study the effect of using computers to complement classroom instruction

for my students in the ENS 1241L Writing Lab course, the same course I had taught during the summer. The students of this course would be used as my experimental group to determine if they developed better writing skills, improved comprehension of subject matter, and enjoyed the learning experience of a computerized classroom environment using appropriate computer applications. The course met Monday through Thursday for eight weeks.

I spent several hours in the SYNERGY Center reviewing appropriate software and materials for ENS Level 3 reading and writing skills. I found out that it is important to align the software to what one does in class; this process was interesting because in so doing, I was able to review almost all the software in the Center that pertains to reading and writing. I felt that after such an experience, I could easily structure an outline for another course using what I had reviewed.

My students started with EDL's *Learning 100 On-Line*. Most of the students wasted no time in getting used to this software. Although the software can diagnose and prescribe activities for the students, I elected to create activities for my students that I felt were useful and tied directly into what I needed to cover in class. After completing all the activities in EDL, we then moved to *One Step at a Time*, an in-house program that is also textbook based. The students enjoyed working with this software, since it relates directly to their textbook. Toward the end of the term we moved to *Practical Grammar Series*, then to *Mark-up* and *Word Perfect*. Students wrote all their assignments using *Word Perfect*. They learned how to use a word processor, how to write and edit their work easily. For each software, students were allowed to repeat the activities as many times as they wanted and they could use the SYNERGY Center outside their class time. For a description of each software, see Appendix D.

Monitoring the Study

The management system of EDL's *Learning 100 On-Line* provided a useful report of students' performance, time on task and progress. In addition to getting immediate feedback from the software, I was there to provide additional help and to handle any problems.

At the end of the semester, I had the students evaluate the SYNERGY Center, the assistance, and the software programs based on a rating system of excellent, good, fair, and poor. Most of the responses indicated that the SYNERGY Center and the assistance were good. Most rated the software excellent. All the students said they enjoyed learning by using the computer; they enjoyed working individually and at their own pace. They were satisfied that they got immediate results from their exercises.

Table I

Student Feedback about Computer Knowledge and Software Packages

	Excellent	Good	Fair	Poor
1. How do you rate your computer knowledge?	—	89%	6%	6%
2. How would you rate the following programs in the SYNERGY Center?	—	—	—	—
EDL Learning 100	61%	39%	—	—
STEPS (Adjectives)	67%	22%	6%	6%
Mark-up	39%	50%	11%	—
Practical Grammar	56%	39%	6%	—

I was concerned about how these students would react to the software and to the use of computers for instruction. This led me to include a question about how they would rate their computer knowledge at the end of the term. It is interesting to note that 88% of the students rated their knowledge of computers as good, and only 12% rated this knowledge as fair or poor. All the students surveyed respondedwith a "yes" to the question, "Would you recommend the continued use of computers in this course?" I also asked them to rate how they felt about each of the software packages used, whether it helped them in the course. Table I shows their responses. Selected students' comments about what they liked or disliked about the course and their suggestions on how to improve the course are also shown.

Outcomes

Twenty-one students were originally enrolled in the course. All students completed the course. All but four students passed the course. Even those who failed felt they gained a lot from the course and most of them participated and showed interest in working with the computer. Table II shows the performance of the entire class.

From my own observations, the course was successful notwithstanding a few obstacles and frustrations. I observed that the students in the course benefited from learning required material in a computerized classroom setting. They performed well on tests, and feedback was given immediately. They were able to review and repeat exercises until they fully comprehended assignments. Most importantly, the students seemed enthusiastic about learning.

Table II
Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental Group (N=21)	24%	43%	14%	—	19%	—

Student Comments

- I liked all the programs, because I learned many things about grammar and writing. I also learned how to work with computers. I think the course is good. All the programs were very good.
- I like to learn with the computer because you learn in a different way.
- I like to work with computers, because it's something that calls your attention. For me, it is perfect, different, and I know that I am learning. The computers give me the opportunities to do the exercises again, and as many times as I need to learn. Keep working with the computers.
- The programs in the SYNERGY Center helped me a lot, to clarify manythings, especially in punctuation. I would like more time in the lab.
- I think it is the best way to study. I think it is important to open the lab for more hours, all day for extra practice.
- I think the computer system is a very good teaching method to learn English.
- I think this is an excellent course. I learned a lot and am glad to have been in this class.
- In my own opinion, this class was fun and helpful in understanding many kinds of grammar skills. The computer lab is the most interesting for me.

As is evident from their comments and recommendations, there is a need to incorporate more use of computers in our curriculum. Most of the students enjoyed working with the computer and some went beyond the amount of time required of them. Some even demanded more work and asked for additional resources to help them. It will be ideal to reach that point

when the students can be made more responsible for their learning. It seems that the use of technology is indirectly impacting or nudging our students in this direction without much effort from the faculty.

Recommendations

The experimental program was definitely worthwhile. However, incorporating computerized instruction into the curriculum has been quite a task. I recommend that one class period be given to practicing computer and word-processing functions (saving, naming, opening and closing files) before students engage in writing papers.

The computer-generated reports from assignments helped me keep the students on task. The reports were also printable for the students and the instructor. The students felt motivated and challenged to perform well in order to get high scores. They worked on their writing, editing, or tutorial assignments for the entire class period and were reluctant to leave when the class finished. Conferring with students on revision of papers was easier and more effective on the computer.A few students experienced difficulty and were frustrated because they did not have any basic typing (keyboarding) skills. Typing programs should be available for those students whose ability to function is restricted by a lack of typing skills.

Activities using the computer took more time than the same activities in the regular classroom since students worked at their own pace. The extra time needed to complete assignments on the computer needs to be considered when one designs a course to teach in an electronic classroom.

Handouts of the instructions for each program were available for the students. They were short, precise, and clearly written on color-coded paper, so that students could easily refer to them while using a program.

The physical layout of the SYNERGY Center is poorly designed to use as an electronic classroom. The setup is perfect for an independent lab. However, to use the Center to conduct a class and incorporate computer assignments is somewhat difficult.

With any technical equipment come technical problems. An instructor needs patience to accommodate problems when they arise.

The technical people who manage the SYNERGY Center are familiar with the problems and are always available to help. They work closely with instructors in designing and implementing programs used by the faculty in the SYNERGY Center.

Overall, I believe the results of this experiment support the use of computerized learning tools in the classroom. The ability to control their pace of study is an invaluable tool for students learning and comprehending another language.

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The Setting

When I previously taught ENS 1443/1423 Advanced Reading/Writing (Level 6) during Fall Term 1993 (August - December) and Winter Term 1994 (January - April), regular classroom methodology was employed (teacher/student activities, books, blackboard, overhead projector, handouts, etc.). In addition, the ESL computer lab was used by some students to complete their assignments.

I noticed that the students in these classes often encountered difficulties understanding the

concepts, and the activities that followed were not enough to reinforce the learning. In addition, the course seemed tedious and students were not focused. This prompted me to start exploring and incorporating other methods of teaching, especially with technology.

About the Course

The Advanced Reading/Writing class is a six-credit course which prepares our ESL students for ENC 1101, a college requirement. While most of our students come to this class from previous levels within our program, a few test right into Level 6 by their Michigan Test scores.

About the Students

The thirteen ESL students enrolled in this class came with a variety of skills and a range of knowledge, purposes and functions, all of which aid in the writing process. Except for a Bulgarian student (fluent in Spanish and Russian), all others were Hispanics.

The Design

For the Fall Term 1994, I wanted to study the effects of using computers on the students enrolled in the ENS 1443 writing course who would be using the SYNERGY Center. I wanted to compare the amount of progress these students would make in the areas of spelling, vocabulary and writing with that made by the same class that I had taught previously. This comparison would assist me in assessing the overall impact of combining my teaching with a computerized learning environment. This class would be used as a benchmark in exploring the possibilities in this area. How would students react to my software selection, and what impact would this have in the students' overall performance, motivation and learning? The findings in this study would be used to structure a more formal study for the Winter Term 1994.

I also set up ten students from the ENS 1341 writing course (Level 4) in the SYNERGY Center to further enhance their reading and writing. This group was experiencing difficulty with grammar and mechanics. They had been asked to register for my ENS 1441 writing lab course (Level 5) and had agreed to continue on with me to the ENS 1443 writing course (Level 6) — the last in the series. These students got involved with the EDL *Learning 100* reading program, and they showed tremendous improvement in their comprehension and their writing ability. I intend to track the performance of these students through subsequent courses.

The Fall Term 1994 class was taught using a modified version of the Whole Language Approach, where writing is seen not only as a mode of self-expression, but also as an aid to thought and reflection. This is accomplished through the use of journals, where the instructor engages the students in written communication, allowing them the opportunity to recall experiences and reflect on learning. (Documenting their thoughts demonstrates how writing can support thinking and learning.) In addition, students were exposed to reading literature. Armed with a diagnostic writing sample, I took the students to the SYNERGY Center, where they were asked to type what they had just written.

These students had little or no knowledge of computers, but most could type. The first week of class was used to introduce them to the basics of *WordPerfect 6.0*. Disks were given and they were taught how to save. (Later, fonts, spacing, size, and style were added.) This would meet one of the requirements of the course, namely to type all their work. They took it upon themselves to begin their brainstorming and drafts on the computer shortly after. As the students discovered different skills, other commands were added to their knowledge bank. On the student feedback form given to this class, it was noted that most students were intimidated by the lab when they first encountered it but later felt that their writing had improved drastically.

In addition to word processing, *Mark-Up* was used to further reinforce grammar mechanics.

Paragraphs were also edited by using this program.

Monitoring the Study

Spelling. Studies have shown that there is a direct relationship between writing and spelling. Because I felt that students were burdened with more serious problems when writing, I wanted their work to be free of spelling errors. They were taught how to check their spelling by using the *Speller*. The results were consistent throughout the term. All (except one student where a learning disability caused him invariably to use the wrong homonym) were successful.

Vocabulary. Since this class read classics, they were required to keep a list of vocabulary items in their double-entry journals and use a minimum of two new words in their writing. While reading their books, they had to copy a paragraph and paraphrase the sentences. Using a thesaurus gave them an understanding of the original word in the sentence that they found difficult to understand. The class was taught how to use the thesaurus in *WordPerfect* and began to use it freely. I noticed that they became more confident in communication skills and spoke with greater authority. (The instructions on the prompts used in *WordPerfect* were almost as challenging as the new words themselves!)

Outcomes

Students were assessed holistically. All the language skills were viewed as integral components of a whole rather than in isolation. As noted above, the students became better communicators as their vocabulary increased. This, I believe, was due to the success they encountered when writing their assignments, using the various tools available and saving these essays for later editing. They were enthusiastic about going to the lab. Their writing became more cohesive and unified, in part due to the immediate feedback *Mark-Up* offers (which they alluded to on numerous occasions) by using different colors to highlight corrected structures and thereby aiding in retention of various grammar forms, and by actually allowing them to read what they wrote clearly without worrying about spelling.

Table I below compares the performance of the students in the experimental group with the performance of those in the same class in two prior terms. For comparative analysis and uniformity, the latter groups have been termed control groups. However, it should be mentioned that the withdrawal grade includes those students who were administratively dropped (they never made it to class) and those who may have been dropped by the teacher to a lower-level course for lack of required skills for the course. As can be seen in the table, students' performance was relatively the same for the two Fall Terms and the Winter Term, with the experimental group showing improvement in both withdrawal rate and success rate.

Table I
Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental (94-1) N=15	20%	20%	27%	—	27%	7%
Control I (93-1) N=24	21	13%	17%	—	33%	17
Control II (93-2) N=11	18%	18%	55%	—	9%	—%

For the Winter Term 1993, the students had better success rate, with no students withdrawing. From past experience, Winter Term students seems to exhibit higher withdrawal rate and I have purposely included this term to better track the performance of the students. Thus, it will be interesting to see if the current Winter Term (1995) will show similar results with that of 93-2.

Recommendations

The SYNERGY Center encourages collaborative learning, social interaction, and creativity. It offers students the opportunity to improve their

problem-solving skills, while allowing the teacher to become a true facilitator. Because intensive reading stimulates interest and provides students with language patterns, the electronic classroom was a natural complement to our advanced reading/writing class. One of the strengths that computers have is their ability to measure and record almost immediately; they free us from tedious record keeping. Another is their ability to present relevant language directly, as evidenced by the students' search for all possible occurrences of a given word or combination of structures in a line or more of context from which it is possible to deduce meanings or induce rules of proper usage.

While my students flourished academically, they were hampered by their lack of typing skills. I would also recommend that computer training by knowledgeable personnel be available for the first week or two of classes. In addition, faculty training should be on-going and time for practice, planning, and reviewing software programs that exemplify principles of good instructional design and the best practices for promoting second-language learning should be incorporated into the program. Considering the opportunities afforded by existing and emerging technology, we have failed to exploit its potential. Collaborative research is required by faculty to establish other effective ways of guiding our students through this web of technology.

MAT 0024 in the SYNERGY Center

Homestead Campus

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The Setting

This study set out to determine whether or not the use of the SYNERGY Center as a teaching aide in MAT 0024 (College Prep Algebra) would produce a positive effect in the performance of students. The use of the SYNERGY Center here refers to the use of computer-assisted instruction, particularly the CSR math software.

The Design

Two classes of MAT 0024 taught by the researcher (Ian Cobham) were used in the Winter Term 1993 (January-April) at the Homestead Campus. Both classes were offered during the day (one on Mondays and Wednesdays, 12:00-1:15 p.m. and the other on Tuesdays and Thursdays, 10:35-11:50 a.m.). Because day and evening students differ in age and other factors, including motivation, it was decided to select classes with similar factors that affect their performance. One class (control group) was taught using traditional classroom techniques without the SYNERGY Center. The second class (experimental group) was also taught using traditional classroom techniques, but the students were required to go to the SYNERGY Center, where they used a particular software (CSR Level V) to obtain additional help on certain topics.

A pre-test was given to both groups. This pre-test was a departmental final examination for MAT 0024. It was given on the first day of class to both groups, and the groups were told it was a placement examination. Anyone who did extremely well would have been placed in the higher-level course (MAT 1033). No one scored high enough to be moved to MAT 1033. The two groups were taught as outlined above and a post-test was given at the end of the semester. The post-test was another departmental final examination for MAT 0024.

Results

As expected, both groups improved on the post-test; i.e., the mean on the post-test was higher than the mean on the pre-test for both groups (see Table I). This meant there was nothing fundamentally wrong with the teaching method of the instructor or the departmental final examination. The means for the post-test for the control group and experimental group were compared. The mean for the experimental group was higher than the mean for the control group (see Table I). Thus, it might be concluded that the use of the SYNERGY Center as an aide may be beneficial to the teaching process. Further statistical analysis would have to be carried out before any definitive conclusions could be reached. It was also possible that the students in the experimental group had a better

math background than those in the control group.

To determine if math background might be the reason, a comparison of students with like ability in the control group was made with similar students in the experimental group. Students were judged to have the same ability by their performance on the pre-test. The analysis was done by comparing the means of those students (see Table II). Thus, if the mean for the control group was higher than the mean for the experimental group, then it could mean that the use of the SYNERGY Center as an aide might not have been beneficial in the teaching process. Again, more statistical tests would need to be performed.

Table I
Means / Differences

Classes	Pre-Test	Post-Test	Difference
Control Group	17	65	48
Experimental Group	21	79	58

Table II
Means on Post-Test Based on Ability

Ability	Score on Pre-Test	Control Group	Experimental Group
1	0 - 9	46 (4)	78 (3)
2	10 - 19	86 (3)	77 (6)
3	20 -29	84 (2)	88 (1)
4	30 - 39	- (0)	80 (3)
5	40 +	57 (1)	81 (2)

* The numbers in parentheses are the number of students in each group.

Table III
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Experimental Group (N=21)	58%	14%	4%	2%
Control Group (N=15)	40%	20%	13%	27%

Overall, the means on the post-test, based on the ability level, were higher for the experimental group than for the control group. However, a T-test showed no significant difference in the means at .05 and .10 levels of significance for both groups. The final grade distribution is shown in Table III for both groups. Because of the sample size, it was felt that a replication of the study would be needed before more generalized statements could be made. This study provided important indicators which needed further investigation in determining the benefits of student involvement with the SYNERGY Center.

Replication Study

The Setting

The findings in the first study prompted a replication study with attention to how much work the students accomplished in CSR. Would the amount of work done in CSR relate to students' success? Thus, in this follow-up study, it was decided to investigate further how many modules students would complete by the end of the term and how this performance might relate to their final grade. In the first study, evening classes had been excluded because students in these classes usually differ in age and other factors, including motivation. For this replication study, an evening class was included to find out if their outcome would be different from the other classes.

The Design

Three classes of MAT 0024, again taught by the researcher (Ian Cobham), were used in the Fall Term 1994 (August-December) at the Homestead Campus. One class was offered during the day (Mondays and Wednesdays, 12:00-1:15 p.m. [Control Group I] and the other two on Tuesdays and Thursdays, 10:35-11:50 a.m. [experimental group] and 6:45-8:00 p.m. [Control Group II]). These classes were selected because they were the ones taught by the instructor during that semester. As was done in the prior study, two classes [Control Groups I and II] were taught using traditional classroom techniques without the use of the SYNERGY Center. The third class (experimental group) was taught using traditional classroom techniques, and the students were required to go to the SYNERGY Center and complete certain assignments by a particular date, using the CSR Level V software. Only the students in the experimental group were allowed to use the SYNERGY Center. As in the previous study, a pretest and a post-test were given to all the groups.

Results

As expected, all three groups improved on the post-test; i.e., the means on the post-test were higher than the means on the pre-test (see Table IV).

The means for the post-test for Control Group I, Control Group II, and the experimental group were compared. The pre-test means were slightly higher for the experimental group (14.93) than they were for Control Group I (14.00) and Control Group II (13.56), but the post-test means were much higher for Control Group II (77.88) and Control Group I (75.76) than for the experimental group (see Table IV). In fact, the mean for Control Group I was about five percentage points higher, while Control Group II was about seven percentage points higher. This outcome conflicted with the result of the previous study. Thus, one might be tempted to conclude that the use of the SYNERGY Center as an aide was not beneficial to the teaching process. Further tests, however, would need to be carried out.

It was also possible that the students in Control Groups I and II had a better math background than those in the experimental group. To determine if that were the reason, a comparison of students with like ability in Control Group I and Control Group II was made with similar students in the experimental group. This analysis was done by comparing the means of those students, as was done in the first study (see Table V). Students were judged to have the same ability by their performance on the pre-test. If the means for Control I and II Groups were higher than the means for the experimental group, then it might mean that the use of the SYNERGY Center as an aide may not have been beneficial in the teaching process.

On comparing the means of Control Groups I and II based on ability level, it can be seen that the means are higher for Control Group I for every ability level. On two of the four levels, the

differences seem to be significant. When Control Group II and the experimental group are compared, it appears as though Control Group II performed significantly higher at two of the four levels. Also, it appears as though the experimental group performs significantly higher only at one level (level 3) and barely outperforms Control Group II at another level (level 4). Overall, the means on the post-test, based on the ability level, were higher for Control Groups I and II than for those in experimental group.

However, when an ANOVA (Analysis of Variance) was performed, there were no significant differences among the groups. It was learned from the first study that some students do not actually complete all assigned work. The question, then, arises, "How does one measure how much the students in the experimental group accomplished in their use of CSR during regular SYNERGY Center visits?" These students were given thirty-three modules in sets that relate to each of the exams. It was decided to check how much each of the students accomplished. Those students who completed more modules seemed to also perform better. Table VII shows the number of CSR modules completed and students' grades. In looking at this information, it seems that there may be a beneficial effect from using the SYNERGY Center for students who complete the prescribed modules in CSR.

Table IV

Means / Differences for Classes A, B, and C

Group	Pre-Test	Post-Test	Difference
Control Group I	13.56	75.76	62.20
Control Group II	14.00	77.88	63.88
Experimental Group	14.93	70.76	55.83

Table V

Means on Post-Test Based on Ability

Ability	Score on Pre-Test	Control Group I	Control Group II	Experimental Group
1	0 - 9	66.89 (18)	74.11 (9)	59.42 (12)
2	10 - 19	85.29 (7)	80.56 (9)	71.50 (8)
3	20 -29	85.50 (2)	79.20 (5)	85.40 (5)
4	30 - 39	89.00 (2)	81.00 (1)	85.00 (4)
5	40+	5	40	- (0)

* The numbers in parentheses represent the number of students in each group.

Table VI
Final Grade Distribution

Group	Satisfactory	Progress	Unsatisfactory	Withdrawal
Control Group I (N=36)	80%	11%	6%	3%
Control Group II (N=31)	61%	13%	16%	3%
Experimental Group (N=41)	46%	22%	15%	17%

Table VII
Range of CSR Modules Completed by Grade

Range of Modules/Grades	Satisfactory	Progress	Unsatisfactory	Withdrawal
0 - 10	4	5	2	5
11 - 20	3	3	-	-
21 - 33	11	-	-	-

Out of the forty-one students registered in the experimental group, only thirty-three were registered in CSR. The performance of this group is shown in Table VII. Among the eight students not registered, one student earned a satisfactory grade, another student earned a progress grade, four students had unsatisfactory grades, and two students withdrew from the course.

Conclusion

The goal of the first study was to establish whether the use of CSR in the SYNERGY Center was beneficial to students. The scope of the second study examined how students' performance correlated with their accomplishments on CSR. The results show that students should be encouraged to complete more modules in CSR as this seems to contribute positively to their success. A closer look must be taken at how much was accomplished in CSR as shown in Table VII. The results in both studies show that there are no significant differences between the means for both the experimental and control groups. This indicates that there was no advantage observed of SYNERGY over traditional methods. It was also observed that students who used the SYNERGY Center had a hard time completing the modules assigned to them in both studies. In the next study, a strategy needs be devised that would facilitate the completion of all modules assigned.

*Project SYNERGY Training Center Report: The University of Tennessee at Martin**

Polly Glover, Project SYNERGY Software Implementation Designer and Coordinator of the Student Learning Center at The University of Tennessee at Martin, has substantial experience in working with faculty to develop and conduct research in teaching and learning. She successfully directed the development of the Student Learning Center under a Title III grant at the University of Tennessee. She received her B.A. in English from the Union University, Jackson, Tennessee, in 1962, and her Ed.D. in Higher Administration in 1987 from Peabody College, Vanderbilt University, Nashville, Tennessee.

"SYNERGY is a window of opportunity: it's not a door yet because we can't fit everyone through. The kids who find computers interesting and realize there is great potential fit through the window. Those who don't see the possibilities can't find the lock to open the window," wrote our lab manager in March 1994, when we had been in our SYNERGY classroom about two and a half months. At The University of Tennessee at Martin, teachers and students have raised windows of opportunity, although there were times when the window seemed stuck; we have learned a great deal about starting a networked computer classroom, and we can see clearly through the window of possibility.

In December 1993, we began planning in earnest for teaching classes in January 1994. On a primarily undergraduate campus of 5,500 students, we realized that we had a special role to play. We could chronicle our experience, in order to answer the questions: *What difficulties do we face and how do we solve them? How does the teacher's role change? Do students behave differently?* We set out with the intention to stay in touch with our feelings and to pay attention to our students' feelings as well. We agreed that there was no way to go wrong in our new computer classroom so long as we were using the technology! We might feel that we could not do everything at once, but that would be okay; we don't do everything possible with a textbook either. We would probably worry about whether we are doing things right, but we do not yet know what is right; we have the chance to discover what works for us. In addition to doing the best job we could in the classroom, we resolved to record our experience. We will report on the objective records of student success and failure in the next SYNERGY report. The subjective record of our experiences, as we began thinking about process, about accessing our own experience and discovering the best ways to learn from that experience, is presented here.

Problems

Space and Furnishings. Finding a room for the SYNERGY Center was difficult because existing classes used all the available classrooms, but when a program moved into new quarters Vice Chancellors Frank Black (Academic Affairs) and Phil Dane (Financial Affairs) identified a room. An empty classroom is just that; ours did not have even a waste basket!

* *For a copy of the full report, write to Polly Glover, Student Learning Center, The University of Tennessee at Martin, Martin, TN 38238.*

We had budgeted nothing for furniture, only for cabling and equipment. Computer Center Director, Otha Britton, identified some tables which became available when another computer facility was refurbished. Through the generosity of several units we obtained a podium, television-vcr cart, overhead projector, desk, and file cabinet. With budgeted funds we were able to purchase a television and vcr, a wall-mounted screen and *Presenter Plus* software, and to provide the expected printer ribbons, paper, and desk supplies.

Time. The best schedules go awry. We had planned to begin learning to use IBM's DESKlab during the summer of 1993, but the computers arrived in November. Because we were meeting a full schedule of classes in the room, we waited until December to install them. Teachers had only one formal training session before beginning a full schedule of computer-assisted classes in January. We identified a student as lab manager in December; a junior secondary-education math major who worked at the Computer Center, she learned to install the software, operate DESKlab, initiate each teacher's class roll, set up class menus, and become acquainted with the individual programs at the beginning of the term, before teachers began assigning lab activities. The teachers prepared to enter the SYNERGY classroom on January 11, 1994, with hardly any experience on the software in DESKlab. Our classes would meet in the room most of the day, and Laura Polk, our lab manager, would staff twenty hours of lab time.

Funding. Our SYNERGY grant budget, originally planned to extend through spring 1994, provided for travel to software reviewers' meetings and to the League for Innovation's Conference on Technology; for payment to faculty members for reviewing software and writing test questions; for supplemental pay for developing the courses of study for reading, writing, mathematics, and developmental study skills courses; for supplemental equipment; and for a lab manager at student work-study rates. The Student Learning Center, under which Project SYNERGY operates at UTM, included in its 1994-95 budget request funds for continuing the project. We especially needed software, for none of the DESKlab software would supplement our first developmental math course, which is equivalent to high school Algebra 1.

Whatever the problems, we began with the realization that our students must arrive in each course at the same end-point as those in traditional sections. No matter how anxious we were, we realized the importance of creating a casual, comfortable working atmosphere for our students.

The Teachers

Since beginning classes in our SYNERGY classroom in January 1994, we have piloted sixteen sections of Reading 111, three English 080 sections, two study skills sections, and one Math 070 section. A group of graduate assistants in the School of Education — Tracy Campbell, Regina Henson, Michelle Perry, Allen Pounds, Shauna Smith, and Shirley Smith — supervised by Reading Center Coordinator Gwen Shelton, developed a course of study which integrated the computer software available in DESKlab with the traditional Reading 111 course materials. A veteran of computer-assisted instruction, Jenna Wright, brought to the English 080 project her seven years of experience in computer-assisted English 111-112 classes and her knowledge of software gained from reviewing both English and English as a Second Language software; she had helped to author the traditional English 080 syllabus and those experiences gave her a good idea of what she wanted to do in the new course. Sharon Robertson had developed the study skills course as a letter-grade, credit course; she was also reviewing study skills software and she adapted her course for the computer classroom. Brenda Lackey had participated in Project SYNERGY Integrator (PSI) planning sessions and brought experience gained in setting up an IBM laboratory for teaching high school mathematics; she spent part of spring term 1994 identifying workable

software because the materials supplied with DESKlab did not meet our Mathematics 070, Algebra 1, needs. Following are excerpts from remarks made by the teachers at the League for Innovation Conference on Technolgy in Houston in November 1994.

Gwen Shelton

The Reading Center is unique among the developmental courses because the classes are taught by five graduate teachers working on master's degrees, with each student teaching three classes. I teach three classes and supervise their work. As coordinator of the reading program, I consider myself a cheerleader for the new teachers. Teacher training is ongoing, as graduate students are hired, take nine graduate hours per semester, teach two to three Reading 111 classes per semester, and leave four terms later.

The first semester in the SYNERGY classroom was also unique. Teachers had expected our experience to follow the Software Implementation Model (SIM) that was developed at Miami-Dade — and it did, but the time was compressed. The SIM developed by Kamala Anandam suggests that the first and second stages of software implementation are an *awareness* of existing software followed by an *analysis* of the software. Miami-Dade suggested a semester in which the electronic classroom was open only to faculty; because of delays in computer installation, our faculty were forced to experience the analysis stage just prior to entering the classroom each day. The third stage is *accommodation*, where faculty members use the software without changing what they do in the classroom. I noticed that at the first part of the semester the reading teachers were having to teach as they had in the traditional classroom, with only supplemental use of the computers as a reinforcement tool. But by the end of the semester they began to move into the fourth stage of *assimilation*, which occurs when the faculty begin to change the textbook and what is discussed in class and to think of incorporating individualized instruction for the students. Now we can see on the horizon the fifth stage of the SIM called *adoption*. In that stage technology will become woven into the very fabric of our teaching and learning.

Jenna Wright

Project SYNERGY offered me the opportunity to write a course of study for my developmental writing class which would integrate the use of computer software into an already well-organized, structured, demanding program — a course of study that already required a minimum of fifteen paragraphs, three essays, revisions on all eighteen writings, as well as a reading component and a complete review of basic writing skills. As much as I looked forward to that opportunity for writing my own course of study, I was aware that my students would have to pass a departmental two-part exit exam with a C both on basic skills and on writing in order to complete the course successfully. Therefore, the goal became to better meet the needs of students in basic skills and writing by offering some different motivation, an opportunity for some self-paced study, and an extended base of learning styles, while keeping in mind that the students would be judged with the same final assessment tools that the traditional classes would use. I found as I wrote the course of study and as I have taught the class that I had to live a real juxtaposition — I had to be extremely organized but totally flexible. I became a living paradox!

We cannot draw any definite statistical conclusions from this one-semester sample; however, we certainly can say that the course compares positively to the traditional classes, as supported by both statistics and the following representative student comments:

"As far as I'm concerned, I think every class should be taught on the computer. I find it much more interesting than traditional English classes."

"A traditional English class compared to a computer English class is quite different. I remember my high school English teacher very well. I used to call her the 'Queen of English.' She knew all there ever was to know about the English language. Her style of teaching was interesting, but I didn't learn as much as I have in this computer English class."

Sharon Robertson

I have always been told, "You can do anything you set your mind to do." This is the attitude one must have in order to succeed in a project such as SYNERGY.

When I first developed the study skills course, I used the LASSI (Learning and Study Skills Inventory) as my formative and summative evaluation tool to develop the general purpose and goals based on the students' needs, the general purpose being to assist students in building better self-esteem by taking control of their time, developing realistic goals, and reaching those goals by better study habits. I set out to help students become acquainted with different techniques for studying, to study different techniques for developing good test-taking strategies, and to develop note-taking ability.

I further polished my plan for the course in the summer of 1993 in a curriculum and instruction course I took as a doctoral student at Grambling State University. For the fall semester, I decided to use *College Reading and Study Skills* by McWhorter, since this book best fulfilled my plan of instruction. Simultaneously, I was evaluating software for Project SYNERGY.

I chose software packages based on two guidelines: Would the piece support my instruction? Was it cheap? As I articulated the software with the textbook, I began to see an overlapping of information. The major point I liked about the textbook — the number of exercises which allowed the students to practice — now became a problem, for I had too much material when I added the software. Also, there were problems with the software, especially trying to network it. I was using ten different pieces of software, not just one or two, so the probability of problems multiplied exponentially. I learned to have back-up lesson plans for my back-up plans, just in case the lab manager didn't have a program up and running.

Brenda Lackey

When I became involved in the project, it was my primary task to plan a course for Algebra 1, using DESKlab. I found the math programs that came on DESKlab were inadequate to be used in our course. It then became my responsibility to recommend a software package to be put on the network to correspond to the topics in the Algebra 1 course. The selection process was made easier when I used the reviews that had been done and placed on Project SYNERGY Software Selector (PSS).

Because of technical problems with software we used, my teaching style did not change very much the first semester. As these technical problems have gotten resolved, I see my role changing more to facilitator and moving away from lecturer. I foresee myself talking less and less in the classroom. As I make changes in my teaching style, the students will take a more active role in the learning process. I think they will be more willing to attempt a problem on the computer before they ask for help from me.

Formative Evaluations

Next after offering classes in the SYNERGY classroom, of second greatest importance was evaluating our experience, in both formative and summative ways. We took time in December 1993 to learn how we could build a subjective record of our experience. Dr. Margrethe Ahlschwede, Assistant Professor of English and Director of the West Tennessee Writing Project, spoke to us about making notes during student interviews. We realized that, in recording this experience, we must become observers; we must, as she said, see the "bigness of the details of our lives." We also explored ways to use idea-generators which frequently appear in composition classrooms — clustering (a non-linear grouping of ideas growing from one key word placed in the center of a page) and freewriting — as ways into our experience. None of us wrote regularly, but we shared our experience at weekly meetings and I made notes.

One of our most important decisions was to meet every Thursday from 12:15 to 1 p.m. in our SYNERGY classroom. During this time, one of two periods all week when no classes are scheduled at the university, we were able to solve many problems. Those meetings became the place to get quick, specific questions answered, with the lab manager giving directions and everyone making notes. For questions demanding more detailed answers she later left directions and answers in the classroom; teachers' queries received by lab time were often answered at their next SYNERGY class period. The meetings provided participants with the big picture; we heard about what each teacher was doing in class, what had worked or failed.

Written Evaluations

On three occasions during 1994, we freewrote for two or three minutes on several questions: (1) What did you do today for the SYNERGY project? (2) What difficulties have you had and how did you deal with them? (3) How do you feel about SYNERGY now? The first time we freewrote was March 24.

In answer to the last question, one teacher noted the excitement of learning with everyone else. As a first-year teacher, she had been feeling apprehensive about not having experience, but "in SYNERGY everyone is on the same level — so I have a comfort zone."

Three weeks later in April we took another snapshot: "What are you doing differently?" When one teacher wrote, "I'm trying to teach many individual people instead of a class, and I see myself as a facilitator or trouble-shooter," he echoed a common sentiment. To another question, "What are students doing differently?" it was observed that the students were doing more individual work and less daydreaming, lots of hands-on activities at their own pace; they were "listening more closely and taking notes during lectures. When they had computer work, they were very busy and extremely focused on the task."

On November 10, 1994, we took a third snapshot. Answers indicated by their specificity and range of activity just how much the respondents had accomplished. As one teacher put it, "The fact that we have completed our first semester and almost the second one with a sense that this is a positive experience and much growth for both students and instructors gives me a deep sense of accomplishment."

Summative Evaluations

Student Surveys. Students considered the SYNERGY class more effective than traditional courses in helping them learn the objectives, they would take another course taught in the SYNERGY classroom, and they would recommend SYNERGY courses to other students. Although the teachers felt less well prepared for the computer instruction than they wanted to be, the students indicated that they believed the instructors were knowledgeable about the computers and the software.

Videotaped Interviews. We complemented the paper-and-pencil surveys with videotaped interviews, in which students said that they believed they had received more personal attention from the SYNERGY class — both from the teacher and from the computer — than from a traditional class. We also videotaped interviews

with each teacher, the lab manager, and the secretary. Highlights included the following:

- Teachers met the challenge and students supported them.
- Teachers supported one another, all willing to share what worked.
- Cooperation is the key.
- The problems are difficult but not impossible.
- Software glitches cause frustration.
- There is never enough time to learn as much as we want to know about the computer.
- There's embarrassment in not knowing everything to make computers work smoothly.

Students' Behavior

Students behaved differently in the SYNERGY classroom and displayed generally positive attitudes. They showed less interest in lectures, preferring to continue working with the computer during the lecture. Those interviewed talked about how seeing something on the computer makes it "hit home better than a lecture." They liked to participate and one said, "It makes us do the work." They thought they comprehended more, liked working at their own pace, and thought the learning took less time than in a traditional class. Their frustrations came from not being able to type well or fearing they would hurt the computer.

The Teacher's Role

At the year's end, we saw the teacher's role change to that of collaborator, and students were pushing teachers to change. Teachers were honest with their students, admitting they didn't know everything. After first term, they concluded that they were giving more individual attention to students.

The teachers would have liked a model, but they tried different approaches and found what felt right for themselves. One said that, with computers, she never gave a lesson as planned and she learned to "tolerate anxiety." Because they did not know how long it would take the average student to complete a unit, teachers sometimes did not plan the ideal amount of work for a class period. Some teachers ended the first term by assigning students computer activities out of class and using class time for group activities. Because students worked at such different rates, they began thinking of completely individualizing the course the next time they taught it.

Not only have the teachers learned about software, but also they have raised awareness for others. Teachers are doing presentations about software. Consciousness-raising extends also to public schools.

Conclusions

At the end of the first year, we learned several very important lessons.

- First and foremost — teachers need *at least* a month on computers before meeting students in class. Not only teachers but also students made this observation. And a computer classroom needs more computers than students enrolled, to allow for non-functioning computers. A computer on the teacher's desk isn't absolutely essential, and we started without one, but we know now that the teacher's computer is very important, because it allows the teacher to look in on a student's work and to send messages unobtrusively.
- A lab manager is essential; a good lab manager is a gift! When Laura Polk took the job, she immediately set about learning to use DESKlab and to make certain the computers were ready for students. The level of her commitment and interest matched that of the teachers, *and* she understood how to set up the files and figure out how the software worked. Such was her ownership of the project that when it was time for her to student-teach, she recruited another secondary-education math major to help in the lab. She also trained work-study students to help teachers with elementary tasks on DESKlab. Those students provided important assistance in the first semester, helping teachers as needed.

- Problems with software can drag on for months. Some of the math software we ordered months ago is still not working well, despite several calls to the software authors and extensive efforts by the lab manager and the Computer Center staff.

- Communication is essential. We must check and double-check the lines of communication to be sure everyone is included. E-mail can help, not only in sending messages, but also in maintaining the computers at optimum level. A quick message to the Computer Center can bring a reply that allows a student lab manager to remove a glitch in a program or retrieve a stuck disk. A short page of directions on how to use each program, and especially on how to avoid certain problems, can help inexperienced teachers. The lab manager's directions about how to solve small problems with the software can help the teachers get through early mini-crises. We called on the Computer Center and the Academic Affairs office several times: both remain interested in and responsive to our needs; both frequently have made special efforts to help.

- Meetings matter. When people share their successes *and* their frustrations, we can't fool ourselves that everything is going just fine; some things must get fixed *today*! Regular meetings help us stay connected and constantly reinforce our sense of being a team.

- There will be unexpected expenses. In our case, when we decided to transfer to the SYNERGY classroom the IBM computers we had received for software reviewing, we thought there would be no expense; we forgot about cables and multi-access units. E-mail isn't free, either.

- A wish list should always be kept ready. At the end of April 1994, we were able to order $3,000 of software, but we had to submit our purchase orders in one week.

- We can't do everything at once. It took a semester to learn the instructional software before we were ready to tackle the networking potential. We found one room for the SYNERGY class, but now we know it would help to have another room for days when we plan discussion and group work.

- Computers remove teachers' blinders. In a traditional class, we can deceive ourselves into believing that everyone "got it," and that we can move on to the next point. The computer programs leave no doubt that one student is still on the first program in week three, and another, on unit four.

- We must consciously work at noticing our experience. We will continue to give paper-and-pencil student surveys and to videotape selected students, to videotape all of the staff, and to take periodic samplings of experience by asking for freewriting on specific questions during meetings.

- It is imperative to balance computer and traditional learning activities, because we all need some means of interacting and bonding. Students want the exchange with the teacher, not with the computer alone. It is, however, interesting to realize that students believe that they got *more* individual attention in the computer class!

- The university community is enormously helpful: we found genuine interest and support from the UTM administration, the Computer Center, St. Philip's in San Antonio, IBM, and Miami-Dade's Project SYNERGY staff.

- People do not complain when they believe something is valuable, even if they are having numerous problems. That is true for students and for faculty.

- Gifts come from many sources — unexpected gifts of furniture and office equipment from other offices, assistance with software from a dean, equipment and instruction from the library's audio-visual department, considerable help in editing a videotape from the Department of Communications.

- Teachers who are flexible, honest, and open make things work. In the freewritings we did periodically, we find the secret attitude. One

teacher wrote about problems: "I just take it in stride and explain to the students that *we* are learning!" Active individuals, eager to try new procedures, willing to learn and to risk, ready to work through problems and capable of sustaining high energy levels all made our project work. The secretary's response – after listing the difficulties of finding time to process more salary papers, more travel papers, more purchase orders, set up more schedules — sums up the attitude of this group: "I don't see difficulties as difficulties but as questions, concepts, procedures to learn and apply. What a great opportunity I have had to be part of SYNERGY at UTM!"

- Last, we must begin now to prepare for coping with a greater and a different demand. With computer access from residence halls as well as from home, students will soon want to use the SYNERGY classroom materials outside the classroom. That leads to questions about self-paced learning, credit, and curriculum — all changes far beyond our project. Our experience so far suggests that the SYNERGY team will be ready once again to accept new challenges.

SYNERGY Center at Richland College

Lolita W. Gilkes, Project SYNERGY Software Implementation Designer, is a faculty trainer and multimedia software developer at the Richland College Faculty Support Multimedia Center. In addition to teaching multimedia classes and workshops, she has taught Introduction to Computers and Database Applications and is the author of software that is being used in the Developmental Reading program. She has degrees from Boston University and the University of Texas at Dallas and is currently working on a doctorate in Applied Technology, Training and Development at the University of North Texas.

Richland College implemented Project SYNERGY in the fall of 1994 with students in the Developmental Reading and Writing programs. Most of the SYNERGY equipment had arrived by the beginning of the semester, so the teachers were able to begin their study at that time. The Developmental Reading faculty have used computers in their program for about seven years, so in the research both the experimental and control classes worked in a computer-assisted instructional model; the independent variable in these classes was the software used by the students. The Developmental Writing experimental class met exclusively in the SYNERGY lab, while the control class only used the computer labs occasionally.

The reports which follow document the outcomes of our first semester in Project SYNERGY research.

Developmental Reading

Katherine Gonnet has taught for the Dallas County Community College District, Dallas, Texas, for 26 years. Six of those years were spent as chairman of the Developmental Studies Division (now Human Academic and Development Division) at Richland College. She has taught developmental reading and college reading improvement classes, as well as honors courses which feature interdisciplinary teaching teams. She has also co-authored three reading improvement textbooks: *Comprehending College Textbooks 2e, Opening Doors* and *How to Prepare for the Test*. She received a B.S. from Texas Woman's University, an M.Ed. from Southern Methodist University, and an Ed.D. from the University of North Texas.

The Setting

Two sections of my DR 091 course were used in the pilot study. I offered the usual method of instruction for one section, and this section served as the control group. The "usual method" of instruction consists of classroom instruction with a textbook and also computer-assisted instruction for one class period per week using the *Word Attack Plus* software.

I taught the other section with the usual method of instruction as well. However, the experimental section used a *different* reading-comprehension software program. The software program, *Opening Doors*, was written by

Richland college computer lab personnel to supplement the reading-improvement textbook used in the classroom. The other reading-comprehension software program originally planned for use, the Level IV CSR modules, did not arrive in time.

Past experience has taught us that computer-assisted instruction in the developmental reading classes is quite valuable. Thus, it was unthinkable to design a study which would deprive even one section of developmental reading students the opportunity to work with the computer. The study we designed allowed us to field-test a new reading comprehension software program and to continue our practice of teaching all developmental reading courses with computer-assisted instruction.

About the Students

The experimental group began with nineteen students and ended with eleven students completing the course with a grade of "C" or better. The control group began with eighteen students and ended with thirteen students completing the course with a grade of "C" or better.

Enrolled in both classes were a number of English as a Second Language students. The experimental group contained eleven ESL students; the control group contained eight ESL students.

Also enrolled in both classes were students who had been diagnosed with learning disabilities. The experimental group contained three such students; the control group contained two students, one of whom was blind. (It is interesting to note that all the learning disabled students in both sections completed the course with a grade of "B" or better.)

The Design

For developmental courses in the Dallas County Community College District, letter grades are given at the end of the semester. These grades may be averaged as a part of the student's grade-point average while at a DCCCD college, but the grades are not transferable.

Monitoring the Study

Both control and experimental classes were held on Monday, Wednesday, and Friday mornings. Both groups attended the computer lab each Monday as part of their regular class schedule. Each Wednesday and Friday morning, both groups attended classroom sessions which involved collaborative learning exercises and teacher presentations of various reading skills.

We have learned that computer-assisted instruction for developmental reading students is more effective if the classroom teacher is present in the computer lab to work with the students and monitor their progress. No students are allowed to sit at the computer in frustration because they have lost their way in the program or are not sure of the directions.

Computer lab personnel also were available to assist in introducing special procedures that had been designed as a part of the management system. They were wonderfully helpful with hardware problems, too. Their support is critical to the success of computer-assisted instruction.

No extra drop-in computer lab time was required for either the control or the experimental group, but students were obligated to finish certain units. If they needed additional time to do this, they were encouraged to use the drop-in lab on their own time. The computer lab is open seven days a week. Students in both groups took advantage of the drop-in lab hours.

Experimental Group Comprehension Software

It was interesting that the new reading comprehension software, *Opening Doors*, which was beta-tested during the semester, worked as well with the students as the software used in the control group. There appeared to be no precipitous drop in reading improvement as a result of using a different type of computer software. The new reading-comprehension software featured longer selections which required written answers. A word-processing program, built into the new

software, allowed students to write their answers. Students were also required to preview each selection; these previews required short written answers. Thus, students were reading and writing about what they had read. Multiple-choice comprehension and vocabulary questions which followed each long selection were also a feature of the new program. (This format was identical to the format of the textbook used in the class. I co-authored the textbook, *Opening Doors*, which was also being field-tested in both sections, but only the experimental section used the *Opening Doors* software.)

As students finished each selection, they were asked to print the results. The program printed their written responses and scored the multiple-choice items. The program was user-friendly. The students had little difficulty with the directions and seemed to enjoy the word-processing feature. The program will continue to be refined, but we are quite pleased with the field-test results. As the *Opening Doors* software continues to be tested and revised, we plan to add sound so students can hear the vocabulary words, as well as access to a dictionary to support the reading activities.

We were disappointed that the Level IV CSR modules did not arrive in time to be used. This software was chosen for the study because, with the *Opening Doors* software, there was a close fit between the objectives in the software modules and the reading curriculum objectives. Past experience has taught us that the computer software must fit the reading curriculum of the course. With this close fit, reading skills taught in the classroom can be reinforced in the computer lab. Time on task is critical to the improvement of reading skills, and work in the computer lab allows this time.

In both groups we used a vocabulary improvement software, *Word Attack Plus*. We have learned to require students to develop vocabulary cards based on the words presented in *Word Attack Plus*. In both sections, students used levels 5-7, and they were required to write each word, its definition, and the word used in a sentence on a 3 x 5 index card. This information was taken from the Word Display section of *Word Attack Plus*. The cards from each level were turned in at designated times throughout the semester, and a teacher-prepared test was given over a portion of the words. The vocabulary-card requirement benefited all students. The English as a Second Language students found the requirement especially helpful.

Student Outcomes

At the final assessment, eleven students out of a class of nineteen received a letter grade of "C" or better in the experimental group. In the control group, thirteen students out of a class of eighteen received a grade of "C" or better. Students who completed the course with a grade of "C" or better were defined as successful.

Table I below shows the number of successful and unsuccessful students in both groups. An unsuccessful student is one who receives a grade of "D" or "F" or withdraws from the course. In the experimental group, there were eight unsuccessful students, and in the control group there were five unsuccessful students.

Table I
Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental N=19	32%	21%	5%	—	16%	26%
Control N=18	39%	28%	6%	10%	6%	10%

In this study, the classes were not matched in reading ability, assessment scores, or ethnicity; therefore, it is difficult to draw a conclusion as to why the SYNERGY class had a lower success rate than the control class since computer-assisted instruction was utilized in both classes.

However, it is possible to draw a conclusion, based on classroom observation, that the *Opening Doors* software was valuable to the students and as effective as the comprehension software used in the control class. The *Opening Doors* software was valuable for several reasons: it featured longer passages and a respond-in-writing component; and it followed the format of the textbook students were using. It was user friendly. Many of the students had never used a computer before, and they were able to follow the directions easily. They worked diligently on the program lessons with a high degree of concentration. Based on these observations, I recommend the software continue to be used.

The study may also indicate that a second comprehension software, such as Level IV CSR modules, might be used successfully in a future study as was originally planned.

Developmental Writing

Joe Mosley has taught Developmental Reading at Richland College for 21 years. He received his B.A. in English from the University of Texas and an M.A. in English from the University of Arkansas.

The Setting

At Richland College, Developmental Writing 091 is a course which prepares students for English 101, the first semester of freshman English. Two sections of DW 091 were used in the pilot study. My control section met in a traditional classroom, while my experimental section met in the SYNERGY Lab.

About the Students

The experimental section began with seventeen students; four dropped the course, leaving a total of thirteen. The control section began with eighteen students; four dropped, leaving an enrollment of fourteen.

About the Software

Both classes prepared out-of-class papers using *Microsoft Works 3.0*.

The Design

Experimental and control sections met Tuesdays and Thursdays for eighty-minute class periods. Students were placed in the classes based on diagnostic test scores or on the recommendation of a DW 090 instructor whose course they had previously completed. Students receive grades of A, B, C, D, F or W, but advance to freshman English based on recommendations from their 091 instructors.

Both classes used *The Flexible Writer*, by Susanna Rich, and a sentence-structure package I wrote for my DW 091 classes. The experimental class did not test any educational software but focused instead on the use of networked computers. Both classes prepared their out-of-class essays using *Microsoft Works for Windows 3.0*, and I provided typed feedback to guide their revisions. In the experimental section, students saved their drafts to the network, and I

read the papers from my office workstation and typed my responses. In both control and experimental sections, peer review involved students reading their papers aloud to the whole class. However, in the experimental section, students also used the network to improve the quality of peer review. They saved their revised drafts to the network so that classmates could view those drafts on their monitors in the SYNERGY Lab and follow along in the text as the author read it aloud.

The course grade was based on the grades on the out-of-class essays, the best of four short in-class writings, and a summary grade reflecting class participation, attendance, preparation for class, and exercise grades. Students' attitudes toward writing tasks and their own writing abilities were measured by a pre-course and post-course attitudinal survey.

Monitoring the Study

I had originally hoped to try out one or more educational software packages in the experimental section but did not do so, largely because none of the software I had previewed by that point seemed potentially useful. After talking to our campus support staff, I decided to focus on finding out what value networked computers might have in a writing classroom. Because students have such difficulty reading my handwriting, I have for several years typed my feedback to their drafts on computer, so it seemed a natural step to use the network to review the papers on my office computer. I was surprised to find that opening a separate document for my responses to papers and toggling back and forth between it and the students' papers reduced the time it took me to respond to drafts. This process probably had no effect on improving the students' writing skills, but the saved time was welcome.

Students did voice a strong preference for the peer reviews done via the network over those done through oral reading alone. Because a sizable portion of both classes was made up of students using English as a foreign language, conventional peer review was often made difficult because of problems created by the writers' accents. Of course, these could have been reduced by having students reproduce enough copies of each paper for all their classmates, but the networked computers made this paperwork unnecessary, and the quality of the feedback improved noticeably after the class began to use them.

Student Outcomes

In the control section four students earned A's, six B's, and four F's. All four F's were earned by students who stopped attending the class without officially withdrawing. Four students officially withdrew. All ten who passed the course were recommended for freshman English, as shown in Table I.

In the experimental section, the grade distribution was wider: four A's, four B's, two C's, one D, and two F's. One of the students earning an F stopped attending without officially withdrawing. One of the two students who withdrew had been required to enroll in DW 091 because she failed the state-mandated writing exam and withdrew when the college received word she had passed a re-test. Of those who passed the course, ten were recommended to advance to freshman English, while two were advised to repeat DW 091 so they would have even stronger writing skills when they proceeded to freshman English.

Table I
Final Grade Distribution

Group	A	B	C	D	F	Withdrawal
Experimental N=17	23%	23%	12%	6%	12%	23%
Control N=18	22%	33%	—	—	22%	22%

Indian River Community College

Background

Indian River Community College is a comprehensive two-year public community college providing high-quality educational services on the Treasure Coast of Florida. St. Lucie County is the home of IRCC's main campus in Fort Pierce and fast-growing St. Lucie West Center in Port St. Lucie. The Chastain Center in Stuart, the Mueller Center in Vero Beach, and the Dixon Hendry Center in Okeechobee are all full-service college centers offering day, evening and weekend classes, as well as college advisement and on-site registration.

About 45,000 area residents of all ages and interests attend classes at IRCC each year. An "open door admissions" policy guarantees admission to anyone with a high school diploma. IRCC offers more than 100 two-year degree programs. Serving all sectors of the community, the college offers over 1,000 courses each semester for professional and personal development, continuing education opportunities, adult basic education, GED preparation, and English for speakers of other languages.

The Setting

Fundamentals of Writing (ENC 0001) teaches the relationship of sentence structure to ideas. This course is taught through a combination of theory, practicum and application. Students learn to utilize appropriate sentence structure, grammar, writing style and organization to effectively present information.

Students taking the course have been identified through testing as developmental in the area of language skills. In general, the participants in this writing class are challenged in the process of identifying a strategy for presenting a theme in a written composition and then transferring that strategy into well-formed sentences which flow logically from one to another. Many of these students have been out of high school for ten or more years, while many other students are in fact recent high school graduates.

The Design

Three sections of ENC 0001 (Fundamentals of Writing) were randomly selected to be part of a one-semester pilot course of Fundamentals of Writing with computer-assisted instruction (CAI). The computer program selected for the pilot course was the Computer-Based Learning Skills and Strategies, *Learning Plus*, Educational Testing Services, Version no. 1.0, 1993.

The three sections of ENC 0001 were originally divided into A2, eighteen students; A3, sixteen students; and A4, fifteen students. A2 would receive CAI every time of the three one-hour sessions scheduled throughout the semester. A3 would receive CAI three sessions a week, every other week. A4 would receive traditional classroom instruction three sessions of one hour each, without CAI. The midterm ending number of students for A2 was eleven; for A3, fourteen students; and for A4, eleven students. Four students never attended in A2; two students never attended in A3; and three students never attended in A4. The average daily attendance for A2 was eleven; for A3, eleven; and for A4, ten. The number of students who had previous computer experience in A2 was six; in A3, four; and in A4, the number of students who had previous computer experience did not apply.

The purpose of this pilot project was to show a meaningful difference in the retention, attendance, and grade average between students who received CAI and those who did not.

Observations

After two months of conducting this pilot project, some advantages and some drawbacks

have been observed in administering CAI. Students who were familiar with computers found the program user-friendly and easy to follow. Students who received CAI improved their grade average 25% over those students who did not receive CAI. Students who received CAI had access to a wider variety of exercises than those who had traditional exercises from the class book only. Students who received CAI got a better understanding of writing as a process rather than as a product.

On the other hand, those students who did not have any training on computer usage found the program too complicated and the directions unclear. The students who received CAI every other week benefited qualitatively more than the other groups in a ratio of three to one, due to the fact that they received more classroom instruction theory that they could apply in the computer exercises in the lab, thus giving them a deeper understanding of writing as a process. Also *Learning Plus* itself did not have an accurate mode of evaluating or recommending specific exercising for the students who scored low in the Skills Profile Tests administered by the program as ongoing tutoring.

Another disadvantage was that once the students took the Skills Profile Test, they could not return to it once they had logged out. Still another drawback was that *Learning Plus* did not adapt to the students' needs, nor did it correct the students' mistakes.

Computer-assisted instruction is indispensable in this high-tech educational age. It is hard to find a computer program that appeals to every syllabus or college program. However, *Learning Plus* proved to be a well-designed computer program that helps the students learn the process of writing step-by-step if, and only if, it is supported by more exercises from other programs, and if it is used as a complement for classroom instruction.

Future

The effects of CAI have been sufficiently demonstrated in Fundamentals of Writing to encourage our college to pursue CAI to increase quality of learning. Based upon the encouraging results of the *Learning Plus* pilot program, we hope to continue to incorporate *Learning Plus* into the ENC 0001 curriculum. In addition, the Center for Personalized Instruction plans to offer *Learning Plus* as a supplemental tool for the college students by having this software program available in the computer lab. IRCC intends to continue its efforts with this and other software to provide quality education to college preparatory students.

Okaloosa-Walton Community College

Background

Located in the coastal heart of Northwest Florida, Okaloosa-Walton Community College has gained a reputation for educational excellence and community involvement in its first quarter-century of service. The college's service district includes Okaloosa and Walton counties, which stretch from the Gulf of Mexico to the Alabama state line. The college district has a population in excess of 175,000 permanent residents.

When its doors first opened in 1964 in a temporary campus of vacant buildings in Valparaiso, OWCC had a faculty of ten instructors, three support personnel and five administrators for the 309 full-time and 458 part-time students on hand. Now, thirty years later, OWCC's traditional faculty consists of approximately seventy-six full-time instructors and 179 part-time instructors, as well as 234 support staff and nine educational centers, serving more than 15,600 students annually.

OWCC has instructional divisions and departments providing a multitude of academic areas from which students may choose. These include adult studies, biological sciences, business, communications, computer science,

hospitality management, fine and performing arts, human development and continuing education, mathematics, health and physical education, physical science, social science, teacher education, trade and industry, and public service.

Developmental Arithmetic

The purpose of the first software-implementation project is to field-test three software programs, *Skills Bank*, *Pre-GED* and *GED 2000*, as the primary instructional resources in a preparatory mathematics course. MAT 0002A, Developmental Arithmetic, develops arithmetic skills for students whose entry-level placement scores may not meet requirements for degree credit. This course is designed to reinforce knowledge of operations with fractions, decimals, percents and signed numbers with applications. At any point in the semester, a student may enter the course or take an exit examination (test groups only). A score of 75% or better will allow the student to exit Developmental Arithmetic.

The research design states the following: At least two sections of this course, approximately fifty students, will be taught in a computer lab in the spring 1995 semester. Students will use the software programs *Skills Bank* and *Pre-GED* for arithmetic instruction and will progress through these programs at their own pace with the instructor providing individual help. The software program *GED 2000* will be used as the students progress to signed numbers and other pre-algebra concepts. The instructor will offer short class lectures as needed.

The evaluation outlines the following: Diagnostic/pre-test assessments will be administered to all students upon enrollment in Developmental Arithmetic. Examinations will be administered periodically throughout the semester to measure the rate of progress between the test groups and the control groups. Final examination scores from the test groups will be compared to those in the control groups.

College Prep English

The purpose of the second software-implementation project is to field-test two software programs, *Skills Bank* and *Realtime Writer*, as the central instructional resource in a preparatory English course. ENC 0020, College Preparatory English (Level II), develops written language skills for students whose entry-level placement scores fall below the minimum required for college-level work. Students receive instruction in sentence structure, paragraph and short-essay composition as well as basic grammar and punctuation rules. At any point in the semester, a student may take an exit examination. A minimum score of 75% will allow that student to enroll in a college-level communications course.

The research design states the following: At least three sections of this course, approximately sixty students, will be taught in a networked computer lab in the spring 1995 semester. Students will use the software program *Skills Bank* for grammar instruction and will progress through the program at their own pace with the instructor acting as a "coach" rather than as a traditional lecturer. The software program *Realtime Writer* will be used for the composition portion of the course. Most of the class periods will be conducted as workshops, with students working through the required grammar and writing units and consulting with the instructor individually. The instructor will offer short class lectures as needed.

The evaluation outlines the following: (Diagnostic/pre-test assessments (both composition and English language skills) will be administered to all students upon enrollment in Level II preparatory English courses. Exit examinations will be administered periodically throughout the semester to measure the rate of progress between the test groups and the control groups. Final examination scores from the test groups will be compared to those in the control groups.

Follow-Up

The results of these two software-implementation projects will be presented in the next Project SYNERGY report.

Part Three: Project SYNERGY Integrator (PSI)

Project SYNERGY Integrator (PSI) is an adaptive management system for Local Area Networks. It provides, on the one hand, a system that has standard faculty and student interfaces and, on the other hand, a platform of neutrality to accommodate multivendor software without affecting the standard user interfaces. It incorporates Project SYNERGY learning objectives and mastery test questions and provides installation options to include multivendor software for assessment and instruction. It provides linkages among diagnostic tests, learning objectives, instructional software, and mastery tests in order for the student to have smooth transitions from one learning objective to another and from one software package to another. It allows the departments and faculty to indicate their preferences as to how PSI should manage their courses and gives them a more efficient handle on how their students are progressing. More than 400 faculty and administrators at two- and four-year institutions have been involved in specifying the necessary features and functions of PSI.

The major components of PSI include the following:

Databases:

- User Databases
- Curriculum Databases

Connectivity:

- PSI Access Module (PAM)
- PSI Command Module (PCM)
- Software Connectivity Module (SCM)

Databases

User Databases. The heart of PSI is the set of user databases it maintains and the linkages among them. The *student database* contains information about each student and his/her progress. It is configured to allow a student to work in multiple disciplines, in multiple courses within any discipline, and across terms, and to be treated as one person. The *PCM user database* contains information about the faculty and staff users of the system, including user preferences for how PSI should manage their respective courses. The *course database* contains information about faculty and staff for each course, a list of students enrolled, and optional groupings of students within a course.

Curriculum Databases. The objectives database contains the Project SYNERGY objectives as laid out in the software review for reading, writing, mathematics, ESL, and study skills/critical thinking. The *diagnostic database* contains information about the various instruments used by institutions for diagnosing specific learning deficiencies. The project team is working with The College Board to incorporate *GUIDES* (diagnostic tests) and with ACT to do the same with *COMPASS*. The *software database* contains information on each instructional software package available to PSI. In particular, it contains information about objectives covered from among Project SYNERGY's complete list. The *testbank database* contains mastery test questions for Project SYNERGY objectives. The items for the testbank have been developed by teams of faculty members from the participating institutions. These questions are being entered into **Banque**, a Windows-based computerized testbank system owned by Miami-Dade Community College that will be used by PSI to generate mastery tests for students.

Linking Among Databases. Each of the databases maintained by PSI contains links to one or more of the other databases. These

linkages are dynamic, being created as new components are added (e.g., as a student drops a course or a faculty member modifies a student's mastery test). The records in the *student, PCM user,* and *course databases* are closely linked to each other. In addition, the student's *Curriculum Plan* is linked to objectives, instructional software, and mastery tests. The *assessment database* contains links between diagnostic information and objectives. The *software database* contains links between software units or lessons and the corresponding objectives in the *objectives database*. The *testbank database* contains test questions linked to objectives in the *objectives database*.

Connectivity

PSI Access Module (PAM). PSI responds to learners through the *PSI Access Module* (PAM) in such a way that they feel they are at the center of the system when they are using it. (See the illustrative screens on pages 101-103.) PAM gets its instructions from the *Learning Guide*, which is the manager of learner activity in PSI, and it constructs *Curriculum Plan(s)* for each learner. A learner enrolled in multiple courses will have multiple curriculum plans that will be displayed on his/her desktop after sign-on. The *Learning Guide* creates a *Curriculum Plan* for a student based on the faculty-preferences list for that course. If a diagnostic test is included in the preferences list, PSI will use the diagnostic test and select the objectives to be mastered from the objectives database; otherwise, it will use the course objectives; having selected the objectives, it selects a list of appropriate software for instruction; and it further generates periodic tests from **Banque** to assess the learner's mastery of objectives. The *Curriculum Plan* keeps up-to-date information on the learner's progress. The learner may ask for help at any time. The learner can send e-mail messages to faculty/staff and receive responses on-line. The learner can request that the faculty adjust the *Curriculum Plan* if he/she is having difficulty.

In the context of PSI, the learner could be registered in a course at college or the workforce, referred for deficiency in some skills, or self-selected for brushing up on skills. The benefits to the learner are (1) having an individualized *Curriculum Plan;* (2) having the ability to monitor one's own progress; (3) having greater access to the instructor; and (4) having a sense of the wholeness of his/her program rather than fragmentation among courses and software.

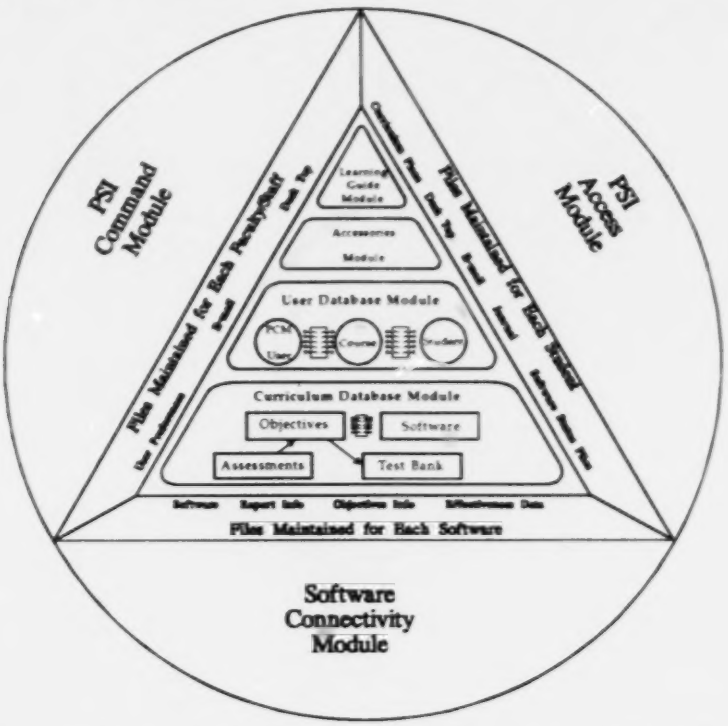
PSI Command Module (PCM). PSI will respond to instructors and their assistants through its *Command Module* in such a way that they feel they are at the center of the system. (See illustrative screens on pages 97-100.) PSI accomplishes this goal by obtaining faculty preferences as to how **each** faculty member wishes to use the system. The options available include, among others, designating a course to be multidiscipline or not, selecting a diagnostic test, specifying the instructional software to be used or letting PSI use all available software, specifying the conditions under which PSI should alert the faculty about students' lack of progress, and selecting the type of student reports. In addition, standard network maintenance functions such as backup and restore, installation of software, and adding and deleting users are accomplished through PCM. Other maintenance functions include generating reports, modifying the PSI databases, and updating the questions in the computerized testbank.

After the students are registered in PSI, the faculty member who so chooses can add or delete students in his/her course; access student records, either singly or in groups; access students' *Curriculum Plan(s)* to see progress; get various reports, either on-line or in print; send e-mail messages to co-workers or students; and create or modify *Curriculum Plan(s).* In particular, the instructor can intervene personally in the learning process for any of his/her students.

The benefits to the instructor are (1) flexibility; (2) systematic feedback on each learner; (3) increased facility to attend to individual learners' needs; and (4) greater potential to facilitate learning. Although PSI is currently equipped with learning objectives and

corresponding software in reading, writing, mathematics, ESL, and study skills/critical thinking, it is a management shell which allows for defining similar content in other disciplines.

Software Connectivity Module (SCM). A unique feature of PSI is the Software Connectivity Module, which provides a common *connectivity mechanism* to communicate with multi-vendor software so that they can all be managed by PSI. PSI initiates the software for the student, passes data to the software, gets data back from the software, and maintains bookmarks. The SCM also collects data about the usefulness/effectiveness of the software in the real world. This data will allow the project team to make improvements in the automated operation of the system to create the *Curriculum Plan(s).*



In developing PSI and promoting its adoption, we have embarked on a new direction, a paradigm shift. In this paradigm shift, educators must go beyond Mission Statements in the catalogs and exhibit a passion for accountability. They must (a) be accountable in terms of reducing student dropout rates and increasing students success rates; (b) orchestrate the use of human and technological resources to do the right things and do them well; (c) not hesitate to question the traditional practices to determine whether or not they have a role in this paradigm shift, and if they do, in what form; and (d) recognize that a substantial andenduring solution to a serious, nagging problem will require concerted and collaborative effort.

In this paradigm shift, software vendors must also evaluate their cost-prohibitive efforts to maintain and market management and instructional systems and consider focusing on quality learning modules. They must shift their focus from a "better than others" philosophy and exclusion strategy to a "variable offerings for variable learners" philosophy and co-existence strategy. There is room for all. They also need to think of a pricing structure that avoids exorbitant front-end cost and allows for sustainable operating cost. PSI is intended to help the software vendors address these challenges by creating a platform of neutrality for management and by providing an open architecture for their software to become operational under this management system.

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If you are interested in producing software for Project SYNERGY Integrator, fill out the form inserted in this report and send it to the address listed at the bottom of the form. A *PSI Timeline* (Table I) and *Recommended Hardware/Software for PSI* (Table II) follow. Please note that a preconference workshop on PSI is scheduled for the next annual conference of the League for Innovation in the Community College (Kansas City, November 5-8, 1995).

Table I
PSI Timeline

	January	February	March	April	May	June	July	August	September	October	November	December
1995				Begin Alpha Test Educational Technology				Begin Phase I Beta Test MDCC				Complete Phase I Beta Test
1996	Begin Phase II Beta Test Training Centers			Complete Phase II Beta Test Begin Early Adoptors Program								
1997						End Early Adoptors Program	Begin General Distribution					

Table II
Recommended Hardware/Software for PSI

A. File Server	25 Workstations	300 Workstations
CPU	486 DX2/66 OR 486 DX 50	Pentium 90 or better
Memory	16 megabytes	64 megabytes
Disk	2 gigabytes	4-8 gigabytes
BUS	32 bit high performance (EISA, MC)	Same
UPS	20 minutes for orderly shutdown Intelligent UPS with auto-shutdown software if unattended	Same
B. Network Software	**25 Workstations**	**100+ Workstations**
Netware Operating System	Novell 3.12 or later	Novell 3.12 or later
Topology	16 megabytes Token Ring or10BASE-T	16 megabytes Token Ring, 10Base-T, Fast Ethernet, Fiber backbone
C. Workstations	**Baseline**	**Growth**
CPU	486DX2/66	486-DX/100 or better
RAM	8 megabytes	16 megabytes
Video	640x480x256 color	1024x768x64k color
Disk	212 megabytes	212 megabytes
DOS	6.0+	6.0+
Windows	3.10	3.10
D. Lab Manager's PC		
CD ROM Drive	one	
Modem	V.34	
4 megabyte DAT Tape Drive	one	

Baseline hardware is intended to balance price and performance based on today's hardware and software market.
Growth hardware takes into account addition of new, more resource-intensive instructional software.
UPS = Uninterruptible Power Supply MC = MicroChannel EISA = Extended International Standards Association

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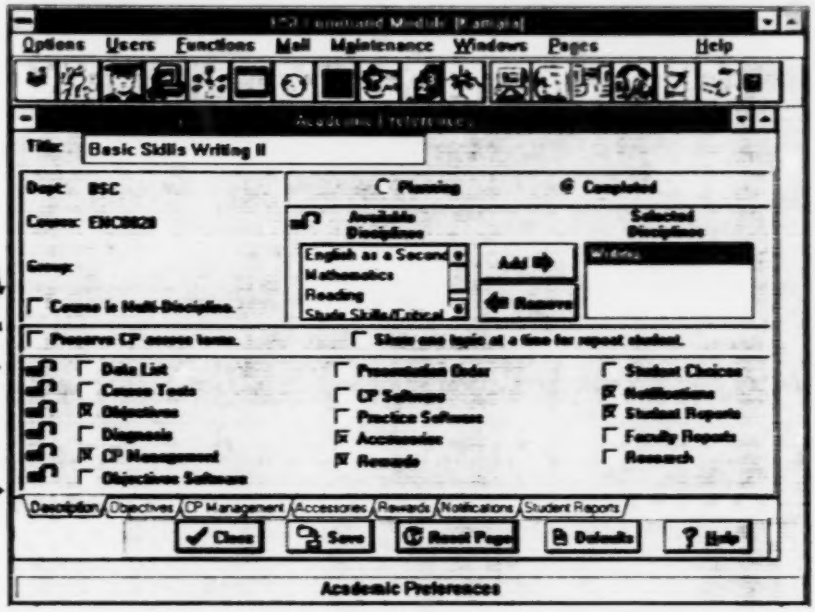
PSI Command Module (PCM)

How Faculty Interact with PSI: Sample Screens

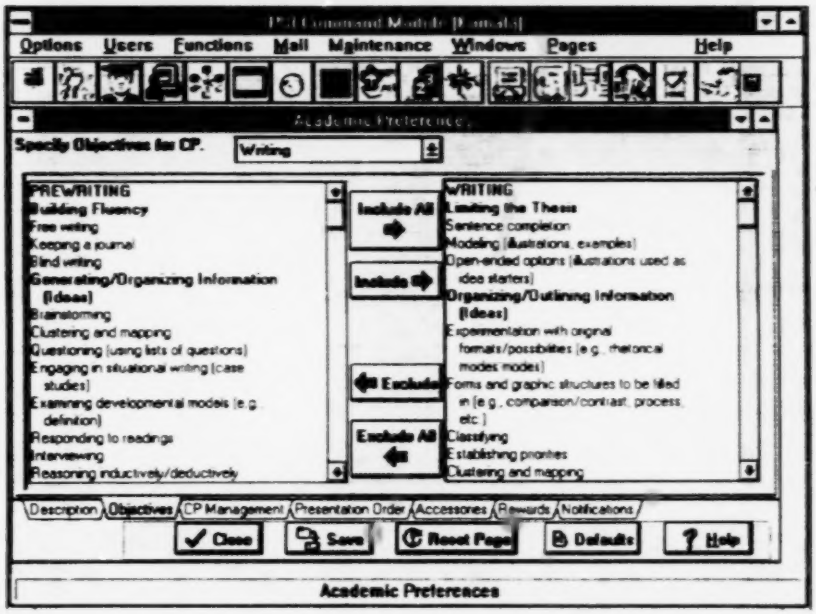
More disciplines can be added if this option is selected.

The Curriculum Plan will be preserved across terms if this option is selected.

These locks can be used by the department chair to maintain uniformity for the department.



These are the areas in which individual faculty members can indicate their preferences for course management.



The left box contains the comprehensive list of objectives used for reviewing software in writing.

The right box contains the objectives selected from the left side by faculty for a particular course.

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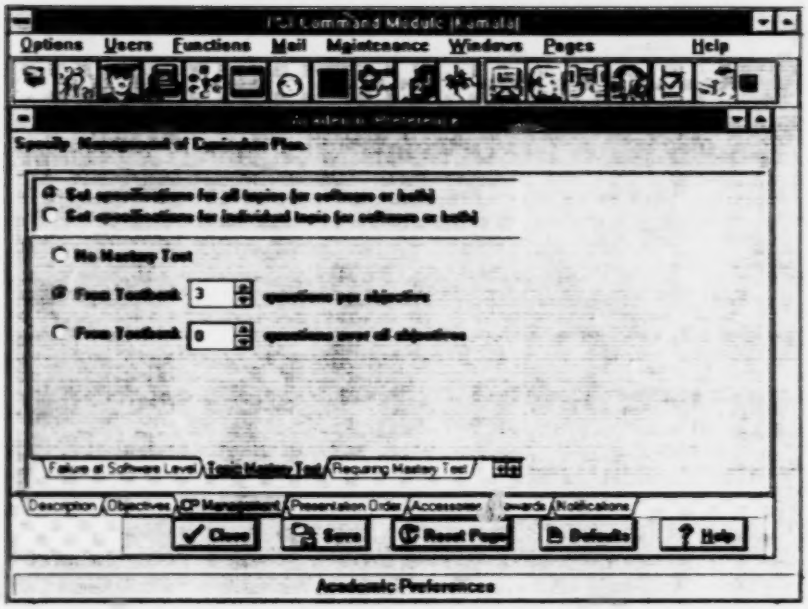
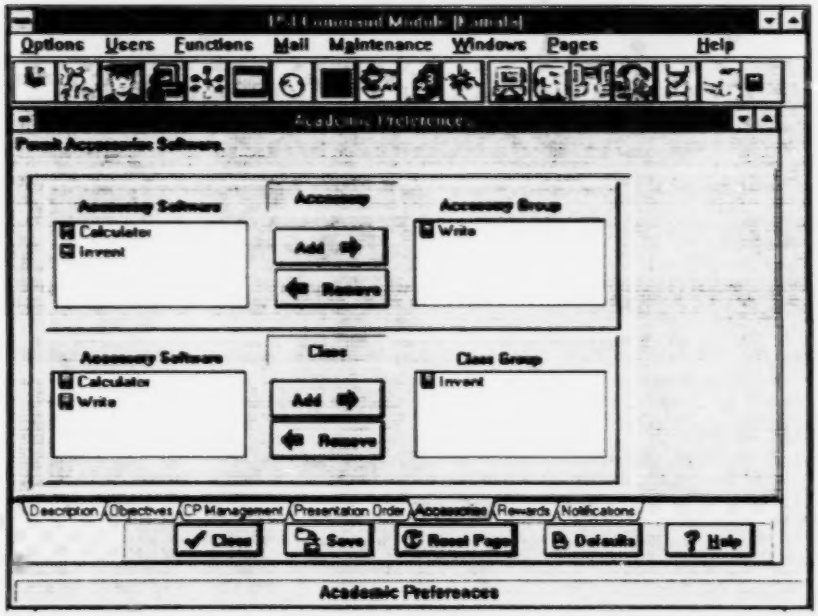
The Testbank consists of all the questions faculty have written to match the learning objectives.





An accessory may be put in the Accessory Group or the Class Group. If it is in the latter, PSI will keep track of time on task. Other accessories such as word processors and spreadsheets may be added to this box.

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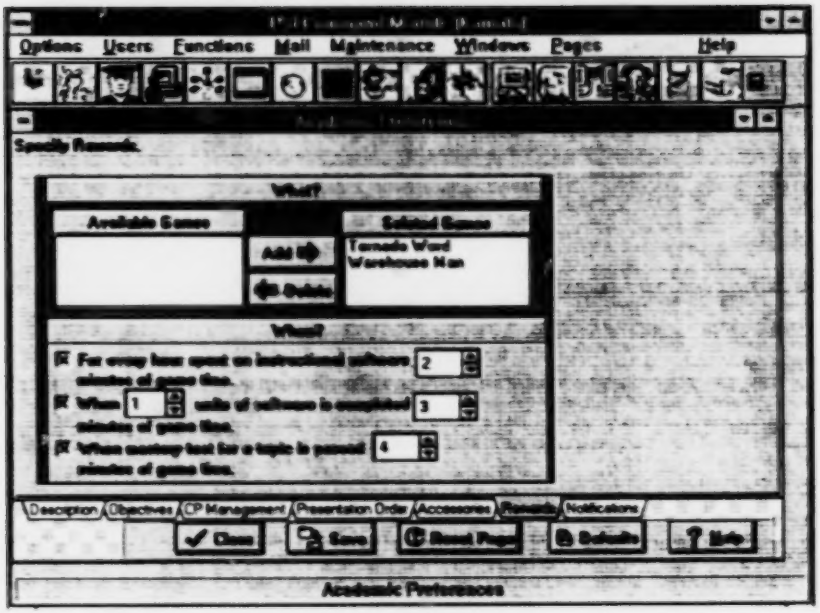

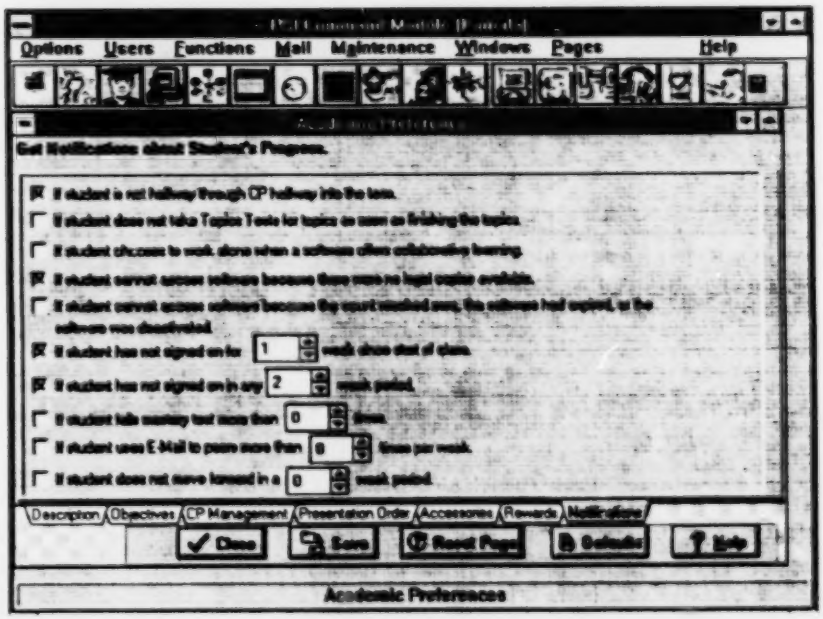

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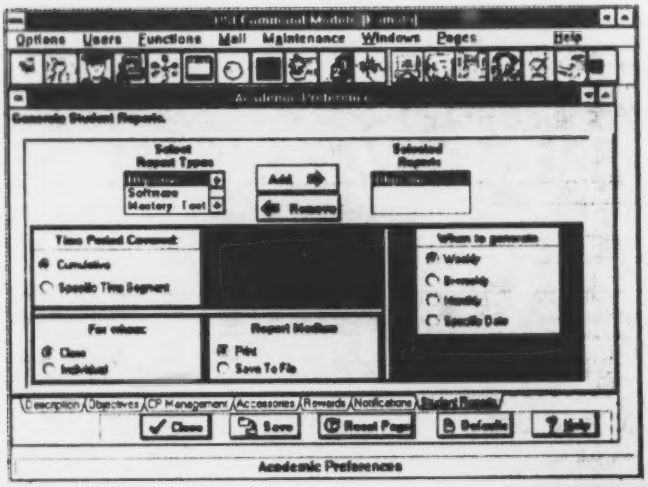
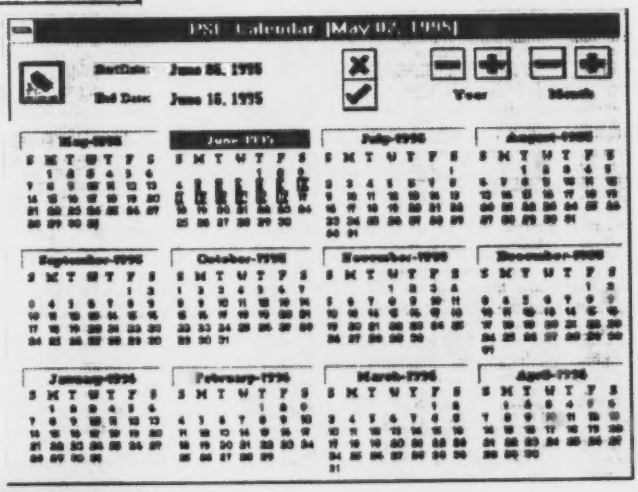
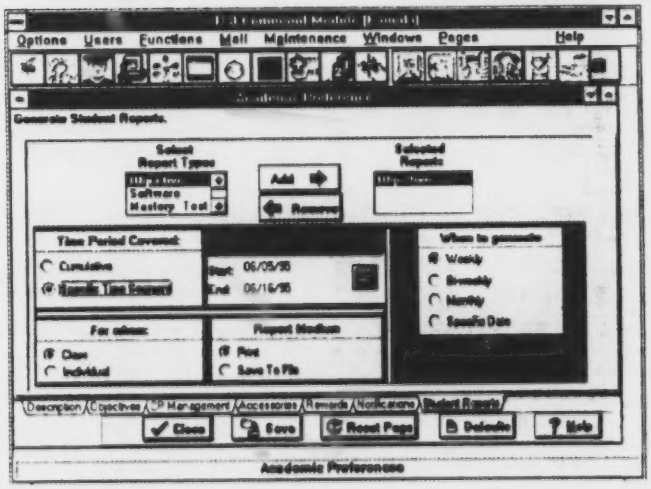


Reports for a class or an individual may be requested cumulatively or for a specific time segment.

With the latter option, a calendar appears for the dates to be specified.





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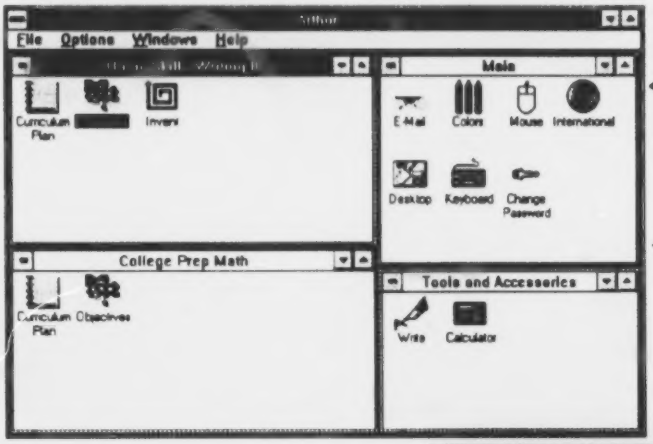
PSI Access Module (PAM)

How Students Interact with PSI: Sample Screens

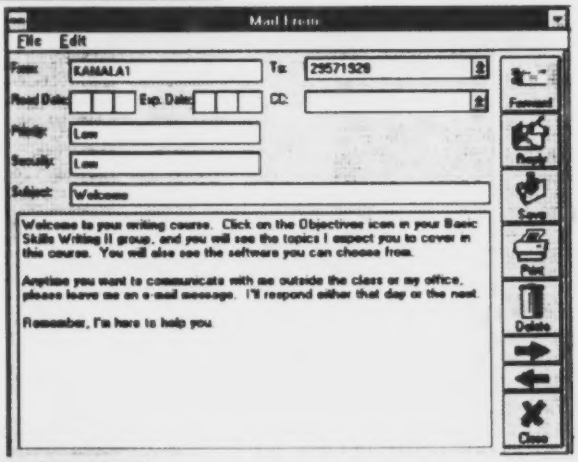
Arthur is registered in two classes in PSI — a writing course and a math course.

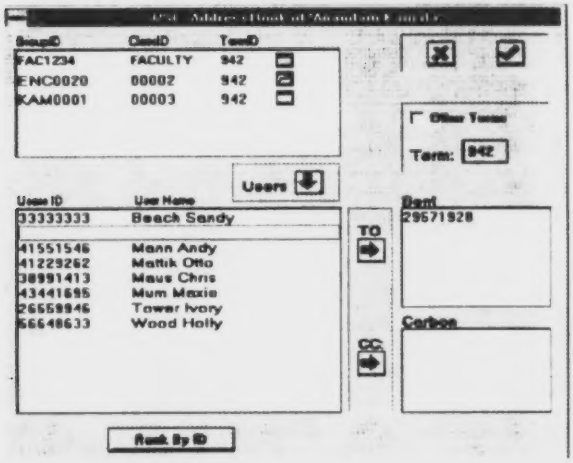


Arthur has standard Windows icons to personalize his desktop.

Note that one accessory — *Invent* — is in Arthur's class group and one — *Write* — is in his accessories group.

Arthur has an E-Mail message from his teacher, who used an address book organized by class sections and then selected Arthur from a list of students in that section.


File Edit
KAMALA1
29571928
Welcome
Welcome to your writing course. Click on the Objectives icon in your Basic Skills Writing II group, and you will see the topics I expect you to cover in this course. You will also see the software you can choose from.
Anytime you want to communicate with me outside the class or my office, please leave me an e-mail message. I'll respond either that day or the next.
Remember, I'm here to help you.



The teacher can also send a broadcast message to all the students.

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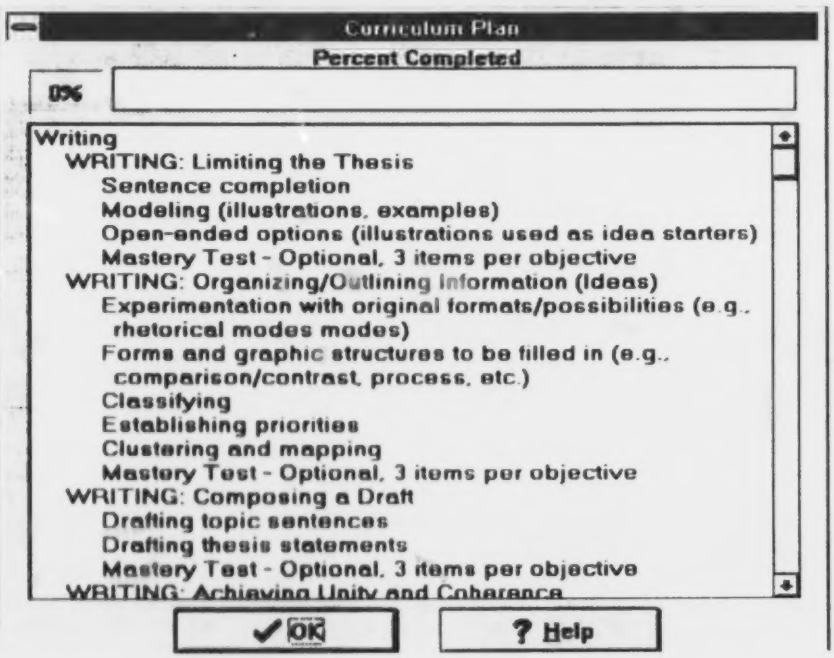
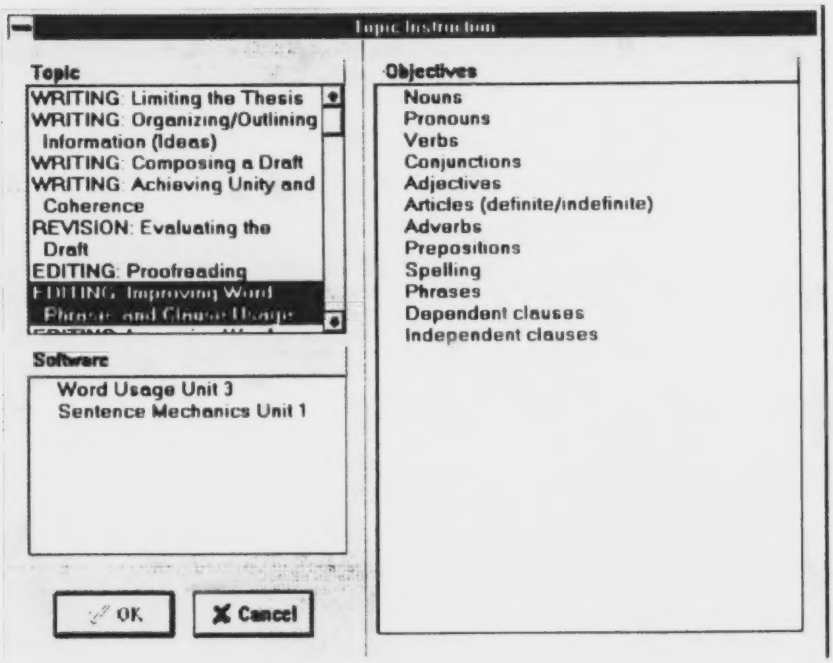

Curriculum Plan
Percent Completed
0%
Writing
WRITING: Limiting the Thesis
Sentence completion
Modeling (illustrations, examples)
Open-ended options (illustrations used as idea starters)
Mastery Test - Optional, 3 items per objective
WRITING: Organizing/Outlining Information (Ideas)
Experimentation with original formats/possibilities (e.g., rhetorical modes modes)
Forms and graphic structures to be filled in (e.g., comparison/contrast, process, etc.)
Classifying
Establishing priorities
Clustering and mapping
Mastery Test - Optional, 3 items per objective
WRITING: Composing a Draft
Drafting topic sentences
Drafting thesis statements
Mastery Test - Optional, 3 items per objective
WRITING: Achieving Unity and Coherence
OK
Help

Arthur's Curriculum Plan is based on the faculty member's choices in PCM (PSI Command Module).

Arthur has highlighted the topic *Editing*, which causes the corresponding objectives to appear on the right and the available software that meets these objectives to appear on the bottom left.



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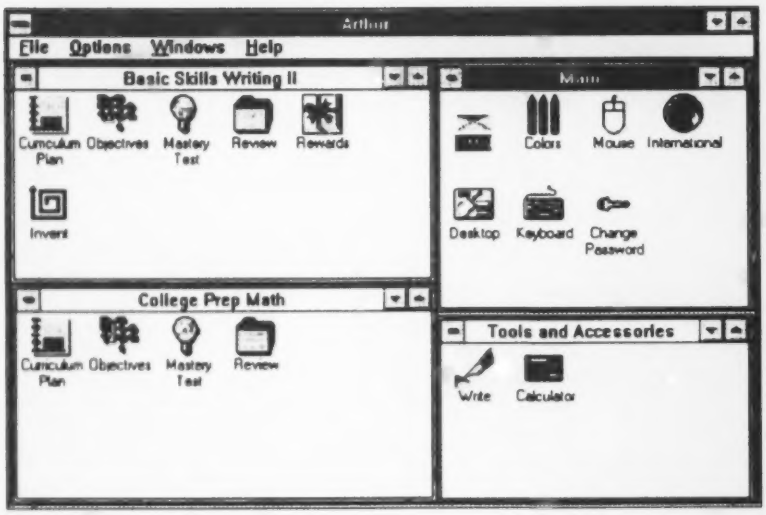
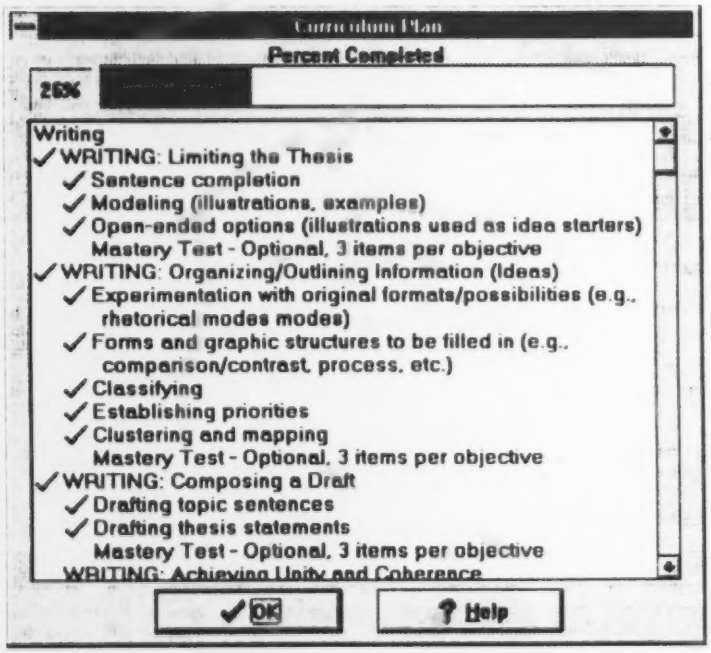
The icons for Mastery Test, Review, and Rewards show that Arthur has completed some work in his Curriculum Plan. The math professor has not chosen to use Rewards.




Curriculum Plan
Percent Completed
26%
Writing
✓WRITING: Limiting the Thesis
✓Sentence completion
✓Modeling (illustrations, examples)
✓Open-ended options (illustrations used as idea starters)
Mastery Test - Optional, 3 items per objective
✓WRITING: Organizing/Outlining Information (Ideas)
✓Experimentation with original formats/possibilities (e.g., rhetorical modes modes)
✓Forms and graphic structures to be filled in (e.g., comparison/contrast, process, etc.)
✓Classifying
✓Establishing priorities
✓Clustering and mapping
Mastery Test - Optional, 3 items per objective
✓WRITING: Composing a Draft
✓Drafting topic sentences
✓Drafting thesis statements
Mastery Test - Optional, 3 items per objective
WRITING: Achieving Unity and Coherence
OK
Help

The bar shows the percent of work Arthur has completed.

Anytime he wishes, Arthur can select Curriculum Plan and see his progress (topics and objectives checked).

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Part Four: Project SYNERGY IV- The Florida Model

Goal Six of the State Board of Community Colleges Master Plan challenges the colleges to "strengthen the utilization of technology to support contemporary standards and future applications in academic computing technologies, administrative computing systems, and educational telecommunications." According to the plan, this goal can be accomplished only when the colleges "expand the effective and proficient use of technology in instruction: computer-assisted and interactive, multi-media learning resources, and library information services." The Master Plan further emphasizes that colleges should "enhance and sustain comprehensive college-prep and student development programs for underprepared students," as well as "increase the proportion of minorities enrolled and succeeding in community college programs."

In attempting to use technology to become more cost-effective and -efficient, college faculty have been disappointed with the non-compatibility of existing software packages. This condition results in the inability of faculty to take a holistic approach in addressing the needs of their students. Since the cost of mastering different management systems produced by different publishers is quite high, colleges have to contend with technological support for their students that is less than adequate.

The Florida community colleges are in a unique position to capitalize on four years of valuable developmental work by Miami-Dade Community College and twenty-one other community colleges and universities nationwide. The State Council of Presidents unanimously endorsed the Project SYNERGY model as the desirable approach for the twenty-eight community colleges in the state. With this as a backdrop, the Presidents Council Technology Task Force developed a proposal in August 1994 aimed at assisting Florida community college faculty to implement proven technology-based processes that will improve teaching and learning in the classroom. The proposal was presented to the Department of Education for funding consideration and subsequently received a grant for $212,000. The project is a collaborative effort involving eight pilot colleges in addition to Miami-Dade and Santa Fe Community Colleges acting as facilitators for the project. See the map on the next page.

Goals of the Pilot Project

The goals were set out as follows:

- To add to existing Project SYNERGY software reviews and mastery-test items.
- To create a model for faculty development and outcomes evaluation to implement PSI.
- To produce individual college and systemwide implementation plans that include activities, schedules, and resource requirements (costs).

Accordingly, the following were the specific activities undertaken in this project:

Software Review Process. Each of the eight participating college designated at least three faculty members to review at least three software packages per faculty member. The reviews focused on reading, writing, math, ESL, and study skills/critical thinking. The review criteria and procedures developed by Project SYNERGY were used for this process. This is a highly systematic process developed over a four-year period that emphasizes locating packages that are currently implemented in educational settings. After the faculty identified the software packages, they reserved the titles with the Software Reviews Coordinator, thereby insuring that packages receive no more than three reviews. Each software review

collected information about hardware requirements, learning objectives, instructional modes, and operational reliability and format. The software was evaluated according to criteria established by faculty who teach underprepared students. These reviews were then checked for consistency and synthesized for inclusion in the Project SYNERGY database called PS[1].

Testbank Question Writing. Each of the eight institutions designated at least three faculty members to serve on a team of question writers to write questions, check them for reliability and validity, and enter them into the computerized testbank system supported by Project SYNERGY. Questions were written in accordance with the standards used by Project SYNERGY objectives for evaluating software. The teams included faculty teaching college preparatory reading, writing, and mathematics. The computerized testbank is then made available to Project SYNERGY Integrator (PSI) to test and monitor progress of the student's mastery of learning objectives.

Software Implementation and Research. A number of software packages at four of the pilot colleges were implemented by faculty on a pilot-test basis to determine their effectiveness in the teaching/learning process. This research is essential for faculty to determine the most effective combination of human and technological resources for the learning environment. These activities used the Project SYNERGY procedures and standards for the research.

Planning Activities. Since it is intended that this pilot project be the initial phase of a multiyear project to implement Project SYNERGY at each of the community colleges, a planning component was included in this pilot project. This planning has each of the twenty-eight colleges developing an implementation plan that can be activated over the next four- to eight-year period. The co-leaders conducted two major training workshops for college faculty participants. A workshop at the beginning of the year provided introductory training for the lead faculty from each college to use to develop plans at their institutions and a workshop at the end of the year allowed for coordinating the twenty-eight individual college plans and developing a systemwide plan. The year-end workshop is also meant to serve as a point for dissemination of the pilot project results.

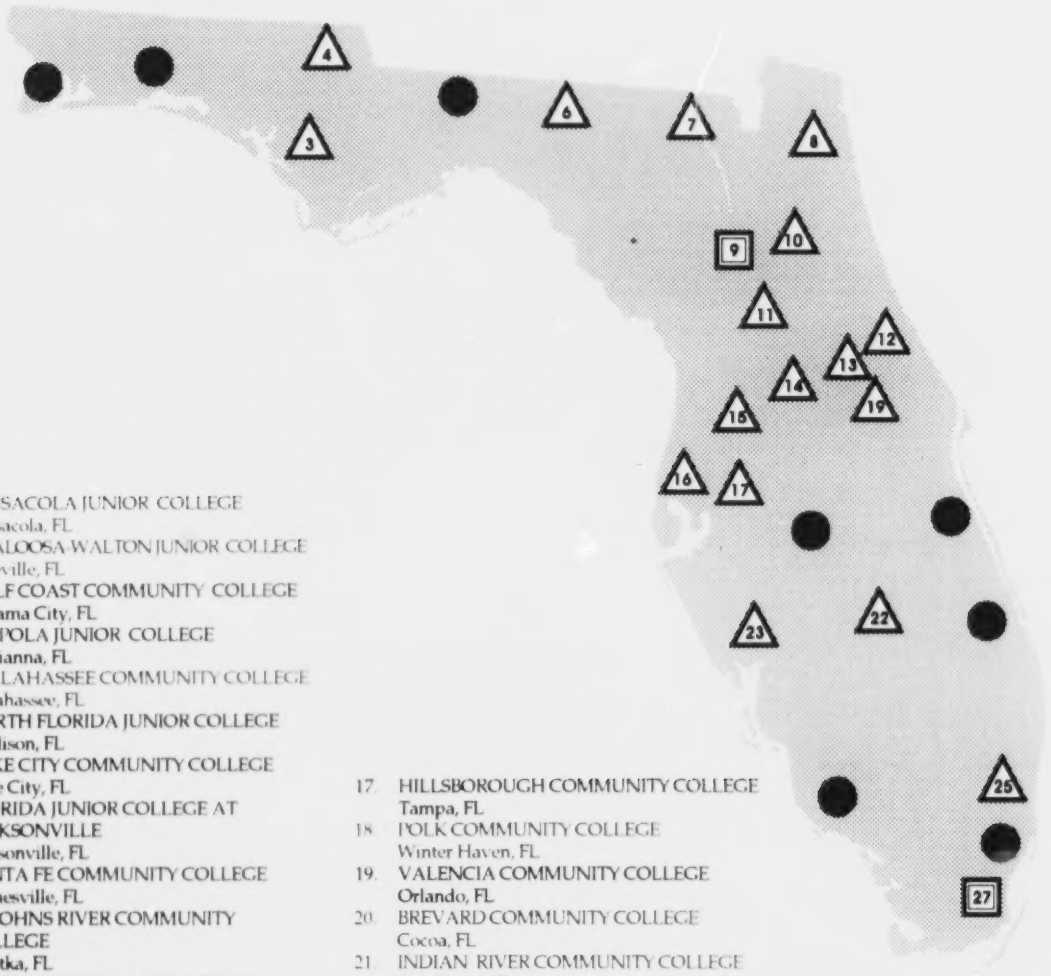
The Implementation Plan

A seven-year plan to implement Project SYNERGY IV: The Florida Model at each campus of the twenty-eight Florida community colleges has been submitted by the State Board of Community Colleges to the Florida Legislature for funding for FY 1995.

The following goals were established by the Council of Presidents for this plan:

- Use Project SYNERGY Integrator (PSI) as the common platform for Florida community colleges to manage the learning environment for underprepared students.
- Provide proven and tested PSI-compatible software for use in Local Area Network (LAN) learning laboratories.
- Use the proven "Software Implementation Model" as the basis for faculty-development activities related to implementing PSI.
- Insure continuous monitoring and evaluation of student performance in college-preparatory courses.
- Improve the quality of available software and develop new software through collaborative development projects including college faculty and software publishers.
- Continuously upgrade and enhance PSI to meet the expanding needs of the community colleges.
- Establish programs that reach back to high school students in order to help them become better prepared for college-level work.
- Establish programs that reach out to workplace training in order to help the community.

Project SYNERGY IV: The Florida Model



1. PENSACOLA JUNIOR COLLEGE
   Pensacola, FL
2. OKALOOSA-WALTON JUNIOR COLLEGE
   Niceville, FL
3. GULF COAST COMMUNITY COLLEGE
   Panama City, FL
4. CHIPOLA JUNIOR COLLEGE
   Marianna, FL
5. TALLAHASSEE COMMUNITY COLLEGE
   Tallahassee, FL
6. NORTH FLORIDA JUNIOR COLLEGE
   Madison, FL
7. LAKE CITY COMMUNITY COLLEGE
   Lake City, FL
8. FLORIDA JUNIOR COLLEGE AT JACKSONVILLE
   Jacksonville, FL
9. SANTA FE COMMUNITY COLLEGE
   Gainesville, FL
10. ST. JOHNS RIVER COMMUNITY COLLEGE
    Palatka, FL
11. CENTRAL FLORIDA COMMUNITY COLLEGE
    Ocala, FL
12. DAYTONA BEACH COMMUNITY COLLEGE
    Daytona Beach, FL
13. SEMINOLE COMMUNITY COLLEGE
    Sanford, FL
14. LAKE-SUMTER COMMUNITY COLLEGE
    Leesburg, FL
15. PASCO-HERNANDO COMMUNITY COLLEGE
    Dade City, FL
16. ST. PETERSBURG JUNIOR COLLEGE
    St. Petersburg, FL
17. HILLSBOROUGH COMMUNITY COLLEGE
    Tampa, FL
18. POLK COMMUNITY COLLEGE
    Winter Haven, FL
19. VALENCIA COMMUNITY COLLEGE
    Orlando, FL
20. BREVARD COMMUNITY COLLEGE
    Cocoa, FL
21. INDIAN RIVER COMMUNITY COLLEGE
    Fort Pierce, FL
22. SOUTH FLORIDA COMMUNITY COLLEGE
    Avon Park, FL
23. MANATEE COMMUNITY COLLEGE
    Bradenton, FL
24. EDISON COMMUNITY COLLEGE
    Fort Myers, FL
25. PALM BEACH COMMUNITY COLLEGE
    Lake Worth, FL
26. BROWARD COMMUNITY COLLEGE
    Fort Lauderdale, FL
27. MIAMI-DADE COMMUNITY COLLEGE
    Miami, FL
28. FLORIDA KEYS COMMUNITY COLLEGE
    Key West, FL

Part Five: The Challenge of Universal Access

Paul Edwards has been coordinator of Disabled Student Services for nine years at MDCC - North Campus. He has developed and is teaching an experimental course called "Computers and the Visually Impaired." He has a B.A. in history from the University College of the West Indies. He has graduate diplomas in International Relations and in Education.

While the statistics are not clear (and for reasons that go beyond the scope of this article), students with disabilities arriving at Miami-Dade typically require more remediation than their nondisabled peers. Consequently, it is essential that any system aimed at providing enriched learning opportunities for students who are underprepared be available to the broad cross-section of students with disabilities. The Project SYNERGY Integrator (PSI) Planning Committee (PC) at Miami-Dade spent considerable time and effort exploring many of the parameters that must operate if access to technology is to be guaranteed for this population. As a member of that committee, I wish to focus on two major areas: the first section discusses hardware, firmware and software considerations involved in creating access; the second section provides a current status report on the viability of the Windows environment for people with disabilities.

Providing the Tools

In planning for the implementation of the Project SYNERGY learning platform, the PC looked at the needs of people who are disabled. Our recommendations represent an appropriate and meaningful approach to making PSI available to most people with disabilities. Two considerations deserve recognition. First, a method had to be found to set minimum standards for each local area network on which the platform will operate. Specific components that each network should acquire include such elements as screen-reading programs, speech synthesizers and screen-enlarging software. Second, methods had to be found to assure that more expensive adaptive equipment that might be required for specific individual users of the system could be made available. The decision to warehouse this equipment at a central location and make it available to campuses when students needed it seems eminently appropriate. These decisions appear to me entirely acceptable.

The Environment

More perplexing is the issue of the operating system we have chosen. For good reasons the decision was made to utilize the Windows environment. For many disabled people this decision is a good one. It is far easier to teach this environment to people who are learning disabled, deaf or mobility impaired. Even people with some vision can be enabled to use this environment with relatively limited adaptation. For people who are totally blind, however, the graphical user interface at the heart of the Windows operating system is only now becoming accessible. Last year, when the Planning Committee wrestled with this issue, there were few, if any, viable options for making this environment usable by people who are blind. Currently, there is one product that is promising that is now on the market and one scheduled for release in April 1995. More

significantly, in December 1994, Microsoft began what appear to be meaningful negotiations with blind people to assure that future releases of Windows will continue to be accessible. It should be noted that these negotiations only began after three states refused to purchase Microsoft products.

Over the early months of 1995, products began to be released that appear to make the graphical user interface accessible through speech to people who are blind. Initial reviews of "Outspoken for Windows" by Berkeley Systems are good, and beta reports on Window Eyes from G W Micro are also very promising.

Making the operating system accessible does not, of course, make individual software usable. The increasing prevalence of multimedia software which depends for its use on the deciphering of pictures continues to be a problem. It is unrealistic to expect every single software package purchased for use on the platform to be fully compatible with the needs of all disabilities. There must, however, be an ongoing commitment by anyone adopting this platform to assure that there is sufficient software to meet each of the skills for which remediation is made available.

Conclusion

In general, then, the Planning Committee has done a good job of recognizing and validating the need to assure that SYNERGY meets the needs of people who are disabled. This commitment must be continued, and there must be an ongoing effort to monitor changes in operating system and approach to ascertain that it will maintain its usefulness for all people with disabilities.

The Challenge of Institutionalizing Technology

Kamala Anandam
Project SYNERGY Director
Miami-Dade Community College

Let me begin my summary of the challenge by defining some terms. "Technology" denotes the knowledge that a civilization has available for adapting and using its environment to fit its needs. "Environment" includes external physical conditions as well as social and cultural ones; the former influence the growth and the latter the nature of an individual or community. In order to meet the challenge of institutionalizing technology, we must first articulate our needs; second, delineate the physical, social, and cultural conditions which affect our environment; and third, examine the knowledge made available to us by the computer with all its paraphernalia.

The primary need of an educational institution is to remain a viable institution in order to serve its students effectively and efficiently, while a secondary need is to enhance the productivity of its employees in order to achieve its primary need. In delineating the conditions that affect our environment, on the growth side, there are thóse such as population trends, funding, competition, and job market. The social and cultural conditions that influence us are leadership, organization (including "mainframe czar" and "microcomputer guru" culture), policies and procedures, governance, communication, support, community orientation, incentives, rewards, and last but not least, professional organizations. The cultural conditions that influence us are the traditions, customs, rituals, and mores that govern our behaviors and expectations. In a way, the conditions (whatever they are) are institutionally accepted in the unwritten laws as "sacred cows," and life goes on.

After defining our needs and identifying the conditions that affect our environment, we need to examine the knowledge made available to us through the computer and all its related inventions and innovations. Some of my major conclusions, not intended to be exhaustive or noncontroversial, are as follows:

- Employees have greater access to computer power and, consequently, have greater individual power which, in turn, poses a challenge to the institutional organization and methods of administration.
- Electronic communication promotes timely dissemination of information and processing of administrative requests, and it enhances teaching and learning through faculty-student, faculty-faculty, and student-student on-line dialogues. This communication has no institutional boundaries.
- The focus is shifting slowly but steadily from teaching to learning which, in turn, poses a challenge to institutional traditions such as contact hours, class size, beginning and end of terms to complete a course, and methods of delivering instruction.
- Increased access to computer power at home, in the workplace, and sometimes at shopping malls and entertainment locations is rendering time and distance irrelevant to teaching and learning. Consequently, investment in buildings and traditional methods of delivering instruction comes into question.
- Productivity has increased in administrative operations, but ironically, almost everyone feels that there is not sufficient time in the day to do everything that needs

to be done. (How often do we hear the expression "It should have been done yesterday!")

- Investment in computer resources for instruction has come mainly from external sources — state and federal agencies, foundations, industries, local property taxes, and lottery. In most instances, this investment has remained an add-on cost and has not been incorporated into our operating budgets. With all sources of funding shrinking in size, educational institutions are challenged as never before to contain the cost of computers within their operating budget. This is not easy given the labor-intensive tradition in education.

- The downsizing we have been witnessing in industries and governments will make its way to educational institutions sooner or later. Will the colleges prepare themselves to be proactive rather than reactive to this eventuality?

- The impact of computers on student performance is not at all conclusive. While there are pockets of excellence to maintain our faith, the outcomes in those cases point to a superior teacher (not necessarily a popular one, a well-known figure, or an award-winner), well-versed in content and pedagogy and willing to use computer assistance.

- Students have been observed to spend more time on a task, work at their own pace, and complete the requirements at different points in time.

Having defined these terms and conditions, we are left with the question: how shall we meet the challenge of institutionalizing technology? I would like to share my thoughts with you as highlights for actions under four components of an institutional infrastructure. My thoughts have evolved not only through Project SYNERGY experience in recent years, but also from my observations over the last twenty years about the progress (sometimes lack of it) in educators' attempts to integrate teaching, learning, and computing. More importantly, my observations are still in the making.

Institutional Policies

- Plan to justify an investment in computing on the basis of achieving institutional goals, such that one can always measure if the goals are achieved and, thus, be more accountable.

- Create a human infrastructure that will facilitate planning, implementation, evaluation, and communication. The present hierarchical structure is not appropriate; we need more grassroots involvement and timely communication, both of which call for a different kind of organization.

- Attend to the rights and responsibilities of citizens of the educational community (students, faculty, staff, and administrators) in the use of the technical infrastructure. A major issue in this regard is to undo the irrelevant aspects of the mainframe culture. Equally important is the need to address the issue of territorial ownership of computing power. We should promote territorial openness.

- Reconsider standards for recruitment of new faculty, administration, and staff. Whom would we like to hire? Should their roles be any different from those already in place? Will there be a window of opportunity, to modify our traditional practices to be in tune with the knowledge made available by computers?

- Reevaluate our criteria for promotion, honors, and awards. This process will, no doubt, tie to the first item above, and the technology aspects will be incorporated into the overall criteria an institution uses for promoting and honoring its employees.

Planning and Budgeting

- Create a position or two to secure external funding on an ongoing basis to meet institutional priorities.

- Undertake a cost-effectiveness study to minimize or avoid the "add-on" cost of computing power. This study should ensure grassroots involvement and place all cards on the table — institutional organization, budget allocation, communication, faculty load, class size, instructional delivery methods, productivity, and so on.

- Restructure the human and technical infrastructure based on the cost-effectiveness study. Some activities are likely to become highly centralized, others to become controlled at the local levels.

- Use a 1:1:1:½ ratio in budgeting for hardware, software, personnel, and upgrading. The cost for personnel includes faculty development, educational research, and technical support

Operations

- Recognize that departmental leadership is critical for integrating computing and curriculum. Instead of being a midlevel manager, the head of the department should be an academic leader and promote the integration to increase the efficiency and effectiveness of the department. Efficiency means doing things right with a minimum of waste, expense, and effort; effectiveness means doing the right things — in this case, serving our students on an individual basis. The chairperson has to be respected for his/her knowledge of the discipline and his/her use of computing power and the knowledge made available by it.
- Promote discipline-based training of faculty in the uses of computer applications. In the past, we have offered numerous workshops for faculty to gain computer literacy and skills in using productivity tools such as word-processing, gradebooks, and spreadsheets. The time has come to stop offering these kinds of workshops and spend our effort and money to identify a faculty member in each discipline to train other faculty to examine and use various instructional software packages in that discipline. These individuals will become a node in the restructuring of the human infrastructure called for by the challenge.

- Promote collaborative projects among faculty within a department, but more importantly across departments, in order to enhance the relevance of what we teach our students. This collaboration will also encourage the territorial openness regarding technology referred to under *Institutional Policies*.

- Recognize and reward employee contribution to achieve institutional goals. Let us not forget that some significant contributions are being made and will be made in the future in the quiet corners of our institutions by individuals who do not care much to be in the limelight.

- Provide pedagogical and research support to discipline coordinators and faculty. See Appendix E for a job description of Software Implementation Director and Software Implementation Assistant as we have developed them at Miami-Dade Community College. The former will function at the campus level assisting several discipline coordinators; the latter will assist in the computer labs.

Faculty Development

- Realize that in integrating computer applications, faculty are expected to become facilitators of learning. This is an enormous role shift from being transmitters of information. One has to become quite knowledgeable about learning in order to facilitate learning. In the facilitator role, one has to be silent more often than not, observe student activity, and know when to intervene. Offering graduate courses in cognitive psychology combined with practical applications will be helpful here.

- Encourage faculty to become their own researchers as they begin to integrate computer applications into their

curriculum. They need to hypothesize what benefits will accrue to them and their students, then orchestrate what they will do and which kinds of computer applications they will use in order to obtain the anticipated results and evaluate the outcomes. This orchestration will require several iterations before one can see some tangible result. For that reason, faculty should view the process as formative evaluation and know that what is critical to this process is their internal frames of reference. Furthermore, according to my colleague, Victor Nwankwo, Project SYNERGY Software Implementation Coordinator, research must be viewed as "an instrument of change and not a litmus test of good teaching."

- Understand that discipline-based technical support at the departmental level is very useful in encouraging faculty to become facilitators of learning because the necessary camaraderie is in place to help them through the changes.
- Focus more on the mainstream faculty than on the champions because it is the former group who will influence the institutionalization process.
- Know that administrators and staff need to understand the faculty's role in integrating teaching and technology and learn about new and different ways to support them.

By way of summary, let us note that as we begin to examine our respective institutional infrastructures, the integration of technology with teaching and learning will undoubtedly raise questions about the following:

- Curriculum, competencies and assessment.
- The practice of treating all courses equally in terms of staffing and time.
- The appropriateness of a group mode for instruction as opposed to individualization.
- The various combinations of human and computer resources that will yield the best results for different students.
- The role of faculty in students' learning and how to measure their contribution to that learning.

Addressing these issues adequately will depend, to a large extent, on the grassroots involvement of faculty, tutors, staff, counselors, and administrators; on a leader who is a good listener and synthesizer of various points of view, taking the time to let the process of human interaction and collective analysis work; and on our viewing the challenge as a dynamic process rather than a static end-product. In the final analysis, meeting the challenge will result in transformation of our institutions.

Appendix A

Project SYNERGY:
Learning Environment 2000 for Underprepared College Students

Cumulative Directory of Project Participants

Kamala Anandam, Project SYNERGY Director
Miami-Dade Community College, 11011 SW 104 Street
Miami, Florida 33176

Name	College/University	Legend
Abascal, Juan	Miami-Dade Community College, Kendall Campus	FW/SU
Abdulla, Taysir	Miami-Dade Community College, District	PS
Acebo, Sandy	DeAnza College	IC
Adams, Carol	Monroe Community College	BW/IC/PL/SM
Agras, Norma	Miami-Dade Community College, Kendall Campus	EC/FE/QC/QM
Aguirre, Karen	Miami-Dade Community College, Kendall Campus	FE/SR
Alban, Hugh	Miami-Dade Community College, Kendall Campus	PL/SI/SM
Alexander, Dorothy	Grambling State University	PL/IC
Alexander, George	Miami-Dade Community College, Wolfson Campus	FW/SID
Alexander, Karlene	Miami-Dade Community College, Wolfson Campus	FE/FW
Alexiou, Jon	Miami-Dade Community College, District	ST
Alsina, Isali	Kean College of New Jersey	PL/SM
Anandam, Kamala	Miami-Dade Community College, District	PS/ST
Anderson, Andrea	Edison Community College	IC(FM)
Anderson, Debra	Indian River Community College	QW(FM)
Aquilan, Herbert	Miami-Dade Community College, North Campus	FW
Argo, Don	Brevard Community College	IC(FM)
Arman, Hal	Delta College	IC
Artzt, Norbert	Miami-Dade Community College, Kendall Campus	PL/SI/SW
Ashcraft, Robert	Miami-Dade Community College, North Campus	FE (2)/FW/GP/SI
Austin, Suzanne	Miami-Dade Community College, Kendall Campus	PB
Babski, Carl	Miami-Dade Community College, North Campus	SI
Bahamonde, Jose	Miami-Dade Community College, Wolfson Campus	PB
Bailey, Julane	Johnson County Community College	QM
Baker, Karen	Okaloosa-Walton Community College	SM(FM)
Banks, Margot	Kean College of New Jersey	PL/SW
Barnes, Karan	Miami-Dade Community College, North Campus	FE/FW/SR/SU
Barrientos, Rene	Miami-Dade Community College, Kendall Campus	FE/SU
Bartholf, Wendell	Miami-Dade Community College, North Campus	FW/PB
Bashford, Joanne	Miami-Dade Community College, Kendall Campus	IP
Bauschek, Eve	Fox Valley Technical College	SW

LEGEND:
Software Review: **SR** - Reading; **SW** - Writing; **SM** - Math; **SE** - ESL; **SC** - Study Skills/Critical Thinking
Question Writing: **QR** - Reading, **QW** - Writing; **QM** - Math; **QC** - Coordinator

BW - Biltmore Workshop Prior to Project SYNERGY (2/89); **DT** - Design Team at MDCC; **EC** - Evaluation Committee at MDCC; **FE** - Faculty Exchange Visit at MDCC (# in parentheses if more than 1); **FM** - Florida Model (Project SYNERGY IV); **FS** - Faculty Scenario; **FW** - Faculty Workshop at MDCC; **GP** - Guides Pilot; **IC** - Institutional Coordination; **IP** - Institutional Planning for PSI at MDCC; **LS** - Lab Scenario; **PB** - Project Briefing at MDCC; **PC** - Planning Committee (attended the planning meeting in Palisades, NY, March 1991); **PL** - Planning for Project SYNERGY Integrator (1991 Survey); **PS** - Project Staff; **SD** - Software Development; **SI** - Software Implementation; **SID** - Software Implementation Design; **SS** - Student Scenario; **ST** - Steering Committee; **SU** - Survey Response: 1992-93 (because some were anonymous, not all are named here).

* Organizer of a Faculty Exchange Visit

Name	College/University	Legend
Becker, Ruth	Pensacola Junior College	SW(FM)
Belcher, Linda	Kern Community College District	IC
Beller, Sheryl	Miami-Dade Community College, Kendall Campus	FW/SE
Benge, Joe	Humber College	SW
Benz, Cheryl	Miami-Dade Community College, Wolfson Campus	SU
Bercelli, Charlotte	Miami-Dade Community College, Kendall Campus	FE/SU
Berger, Adele	Miami-Dade Community College, Kendall Campus	FE/SU
Berger, Ronda	Miami-Dade Community College, Kendall Campus	FW/SID
Berman, Lisa	Miami-Dade Community College, North Campus	PB
Bethke, Roz	Johnson County Community College	QR
Biaggi, Leslie	Miami-Dade Community College, North Campus	PB
Bibby, Patrick	Miami-Dade Community College, Kendall Campus	FE (3) */PB
Bilal, Brenda	Central Piedmont Community College	BW/PL/SW
Bird, Neila	Indian River Community College	QR(FM)
Blitzer, Bob	Miami-Dade Community College, Kendall Campus	FE
Blum, Nedra	Brevard Community College	QW(FM)
Blye, Kenneth	Miami-Dade Community College, Medical Campus	PB
Brady, Linda	Miami-Dade Community College, Wolfson Campus	PC/SW
Bratt, Marion	Phoenix College (Maricopa)	SW
Brodie, Irene	Moraine Valley Community College	BW/IC
Brooks, Sally	Moraine Valley Community College	SE
Brosch, Barry	Miami-Dade Community College, Kendall Campus	FE
Brown, James	Brevard Community College	SM(FM)
Brown, Joann	Miami-Dade Community College, Medical Center	DT/FE (2)*/FW/IP/QR/SID
Buccini, Marianne	Cuyahoga Community College West	SC
Buchanan, Harriette	Appalachian State University	IC/SC
Buckley-Holland, Susan	Miami-Dade Community College, Kendall Campus	BW/DT/FE(3)/IP/PB/PL/QM/SI/SM
Buker, Anita	Miami-Dade Community College, North Campus	BW/FE (2)
Bukowski, Joseph	Palm Beach Community College	IC(FM)
Bullotta, Jim	Miami-Dade Community College, Wolfson Campus	FW/SU
Bunting, Ellie	Edison Community College	QW(FM)
Burke, Nadine	Delta College	PL/SW
Calderon, Kevin	Miami-Dade Community College, Kendall Campus	FE (2)
Calev, Barbara	Miami-Dade Community College, District	PS
Call, Carol	Miami-Dade Community College, North Campus	FW/PB
Campo, Liberty	Miami-Dade Community College, Homestead Campus	FW
Cantrell, Debbie	Bakersfield College (Kern)	QW
Caplan, Elaine	Broward Community College	SR(FM)
Captan, Marcia	Miami-Dade Community College, Wolfson Campus	SU
Cardenal, Maria	Miami-Dade Community College, Kendall Campus	PB
Cardona, Kelly	Miami-Dade Community College, North Campus	PB
Carroll, Jessica	Miami-Dade Community College, Wolfson Campus	BW/SI/SR

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Name	College/University	Legend
Carter, Lamore J.	Grambling State University	ST
Carter, Lena	Grambling State University	SW
Carter, Sandra	Miami-Dade Community College, Kendall Campus	FE/FS
Cassidy, Marcia	Miami-Dade Community College, Kendall Campus	SI
Castells, Diana	Miami-Dade Community College, Kendall Campus	SU
Castillo, Sandra	Miami-Dade Community College, Wolfson Campus	FE/SI/SU
Chamberlain, Greg	Kern Community College District	SID
Chernoff, Lawrence	Miami-Dade Community College, Kendall Campus	PB
Childe, Miranda	Miami-Dade Community College, Wolfson Campus	PB
Childress, Faye	Central Piedmont Community College	BW
Christie, Bob	Miami-Dade Community College, Kendall Campus	FE
Cinclair, Carol	Dallas County Community College	BW/SW
Clark, Tonia	Seattle Community College	IC
Clemente, Iris	Miami-Dade Community College, North Campus	FW
Cobham, Ian	Miami-Dade Community College, Homestead Campus	FE/FW/SI/SM
Cohen, Irene	Miami-Dade Community College, Kendall Campus	FW
Colyer, Jacquin	Miami-Dade Community College, Kendall Campus	FW
Conlin, Mary Lou	Cuyahoga Community College	BW
Connelly, Bob	Santa Fe Community College	PL/QW/SW
Cooner-Berger, Linda	Miami-Dade Community College, Homestead Campus	FW
Cooper, Mary Jane	Delta College	SC
Cooper, Rayna	University of Tennessee at Martin	PL/SR
Cortes-Suarez, Georgina	Miami-Dade Community College, North Campus	FE/PB/SI
Cossio, Matilde "Mattie"	Miami-Dade Community College, Medical Center	FW
Crawford, Joyce	Miami-Dade Community College, Wolfson Campus	BW/EC/FE*/FS/IP/PB/SI/SID
Cuervo, Margarita	Miami-Dade Community College, Kendall Campus	FE/SU
Cueto, Marlene	Miami-Dade Community College, North Campus	DT/FE/FW/IP/SI
Culver, Lee	Miami-Dade Community College, Wolfson Campus	SU
Cunningham, John	Miami-Dade Community College, Kendall Campus	FE/PB/SU
Davis, Gary	Miami-Dade Community College, Wolfson Campus	BW
Davis, Lorna	Miami-Dade Community College, Kendall Campus	FE
Dearing, Carmen	Miami-Dade Community College, Wolfson Campus	PB/SU
DeChaine, Deborah	Miami-Dade Community College, Homestead Campus	FW
Dennis, Vivian	Dallas County Community College	BW/SM
Denton, Pegi	Johnson County Community College	BW
Desjardins, Margaret	Edison Community College	QW(FM)/QR(FM)
Despaigne, Jamaye Renee	Miami-Dade Community College, Wolfson Campus	FE/FW/SI
Diaz, Mary	Broward Community College	SE(FM)
Dietrick, Carol E.	Miami-Dade Community College, Homestead Campus	EC/FW/IP/LS/SID
Dominguez, Nestor	Miami-Dade Community College, Kendall Campus	PB
Dorsey, Don	Foothill College	BW
Doucette, Don	League for Innovation	ST

LEGEND

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Name	College/University	Legend
Doughty, Irma	Miami-Dade Community College, North Campus	FE/PB
Duffis-Sjogren, Osmond	Broward Community College	SE(FM)
Dunbar, Douglas	Okaloosa-Walton Community College	QM(FM)
Dunne, Joe	St. Louis Community College	SW
Dyett, Adrian	Miami-Dade Community College, Wolfson Campus	FE (2)/LS/PB
Edwards, Paul	Miami-Dade Community College, North Campus	IP
Edwards, Richard	Kirkwood Community College	BW/QR/SC/SR/SW
Eisel, Ed	Miami-Dade Community College, District	PS
El Rayess, Suzanne	Monroe Community College	SE
Elledge, Elaine	Pensacola Junior College	SC(FM)
Erickson, Michael	Monroe Community College	PL/QR/SR
Escudero, Katherine	Miami-Dade Community College, Kendall Campus	FE
Eskew, Thomas	University of Tennessee at Martin	PL
Evans, Christine	Miami-Dade Community College, Wolfson Campus	PB
Evseev, Anatoli	Cuyahoga Community College	SE
Ewell, Arcia	Miami-Dade Community College, Medical Center	PB
Fackrell, Jerry	Miami-Dade Community College, North Campus	FE/GP
Falcon, Maria	Miami-Dade Community College, Medical Center	PB
Fancher, Andrew	Miami-Dade Community College, Wolfson Campus	PB
Fante, Cheryl	Central Florida Community College	IC(FM)
Farben, Janie	Miami-Dade Community College, Kendall Campus	FE/FW
Faulkner, Ann	Mountain View College (Maricopa)	BW
Feldman, Philip	Bakersfield College (Kern)	BW
Fernandez, Tushnelda	Miami-Dade Community College, Medical Center	FW/QM
Ferrer, Marta	Miami-Dade Community College, Kendall Campus	FE/PB/SU
Fitton, Diane	Monroe Community College	SC
Fitzgerald, Jeanne	Phoenix College (Maricopa)	PL/SM
Fletcher, Joyce	Northern Virginia Community College	BW
Flowers, Patricia Ford	Miami-Dade Community College, Wolfson Campus	PB
Folsom, Charles	Pensacola Junior College	SM(FM)
Fox, Charles	Polk Community College	IC(FM)
Frauman, Maxine	Lane Community College	SE
Furlong, Tom	Tallahassee Community College	IC(FM)
Gabert, Glen	Johnson County Community College	IC
Gabriel, Dennis	Cuyahoga Community College	PL/SR
Garces, Linda	Delta College	SE
Garcia, Isolde	Miami-Dade Community College, District	PS
Garcia, Judith	Miami-Dade Community College, Kendall Campus	IP/PB
Gardner, Aubrey	South Florida Community College	IC(FM)
Garrett, Judy	Bakersfield College (Kern)	SE
Garrido, Alex	Indian River Community College	QW(FM)
Gell, Sherry	Brevard Community College	SE(FM)
Gerken, Donna	Miami-Dade Community College, Kendall Campus	FE/PB/QM/SU

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* Organizer of a Faculty Exchange Visit

Name	College/University	Legend
Gil, Ariel	Miami-Dade Community College, Medical Center	SE
Gilkes, Lolita	Dallas County Community College	SID
Gilliam, Irene	Tallahassee Community College	QW(FM)
Gist, Richard	Johnson County Community College	BW
Glenn, Azalee	Miami-Dade Community College, Kendall Campus	FE/FW/SI
Glover, Polly	University of Tennessee at Martin	IC/PL/SID/ST
Goldstein, Adrienne	Miami-Dade Community College, Kendall Campus	FE
Golphin, Barbara	Miami-Dade Community College, Wolfson Campus	FE (2)/PB/SI
Gomez, Maria	Miami-Dade Community College, Medical Center	PB
Gonnet, Katherine	Dallas County Community College (Richland)	BW/PC/SI/SR
Gonzales, Al	Miami-Dade Community College, North Campus	SD
Gonzalez, Ileana	Miami-Dade Community College, Wolfson Campus	SU
Granros, Frederick	Miami-Dade Community College, Kendall Campus	FE
Graves, Felicia	Cuyahoga Community College West	SM
Green, Rosemary	Miami-Dade Community College, Wolfson Campus	PB
Greenwood, Elaine	Seminole Community College	IC(FM)
Griffin, Tom	Central Piedmont Community College	BW/IC/ST
Groomes, Marlene	Miami-Dade Community College, Homestead Campus	FW
Grussing, Dale	Miami-Dade Community College, North Campus	EC/FE (2) */IP/PB
Guillermina, Damas	Miami-Dade Community College, North Campus	FE
Haasch, Jane	Fox Valley Technical College	BW
Hafer, Robert	Brevard Community College	QM(FM)
Haferling, Joy	Miami-Dade Community College, District	PS
Hahn, Lorraine	Miami-Dade Community College, Medical Center	PB
Hajdukiewicz, Bill	Miami-Dade Community College, North Campus	FE/FW/SI
Hall, Sheila	Lake-Sumter Community College	IC(FM)
Hanus-Zank, Catherine	Miami-Dade Community College, Wolfson Campus	FW/PB/SU
Harrell, Michelle R	Miami-Dade Community College, Kendall Campus	FE (2)
Hartzog, Gail	Chipola Junior College	IC(FM)
Harvey, Jean	Edison Community College	QW(FM)/SW(FM)
Hasenaur, Teresa	Indian River Community College	SM(FM)
Hauser, Paul	Kirkwood Community College	SC/SW
Hayden, Roberta	Edison Community College	QR(FM)/SR(FM)
Haynes, Margot	Delta College	PL/SR
Hecht, Debra	Lake City Community College	IC(FM)
Heggen, Betty	Miami-Dade Community College, Kendall Campus	FE (2)/LS
Henderson, Bertilda	Broward Community College	QR(FM)
Hernandez, Reynaldo	Miami-Dade Community College, Wolfson Campus	SU
Hernandez, Rosany	Miami-Dade Community College, Wolfson Campus	QM
Hightower, Sue	Tallahassee Community College	SR(FM)
Higley-Nugent, Heidi	Fox Valley Technical College	PL/SM
Hill-Matula, Janice	Moraine Valley Community College	SC/SR
Hilton, Bonnie	Broward Community College	SW(FM)

LEGEND

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* Organizer of a Faculty Exchange Visit

Name	College/University	Legend
Holloway, Alexandria	Miami-Dade Community College, Kendall Campus	PB
Holmes, Beverly	Okaloosa-Walton Community College	QW(FM)
Holmgren, Libby	Johnson County Community College	SM
Hoover, Nancy	Manatee Community College	IC(FM)
Howell, Joe	Gulf Coast Community College	IC(FM)
Humphrey, Ken L.	Monroe Community College	BW
Hungar, Julie	Seattle Community College	IC
Irvine, Kip	Miami-Dade Community College, Kendall Campus	FE
Irwin, Dale	Indian River Community College	QM(FM)
Jalloul, Janet T.	Miami-Dade Community College, Wolfson Campus	PB
Jenrette, Dave	Miami-Dade Community College, North Campus	BW/FE/GP
Jenrette, Mardee	Miami-Dade Community College, District	EC
Jensen, Betty	Tallahassee Community College	SC(FM)
Johnson, David	Miami-Dade Community College, Kendall Campus	FW/SU
Johnson, Jane	Bakersfield College (Kern)	SR
Jonason, Pat	Johnson County Community College	BW/PC/SR
Jones, Betty	Delta College	BW/IC
Jones, Jesse	Dallas County Community College, District	IC
Jones, Sharla	Miami-Dade Community College, Kendall Campus	FW/SI
Jordan, Evelyn	Miami-Dade Community College, North Campus	FW
Joyce, Maria	Miami-Dade Community College, North Campus	PB
Jur, Barbara	Macomb Community College	IC
Kah, Susan	Miami-Dade Community College, Medical Center	PB
Kahn, Sue	Miami-Dade Community College, Kendall Campus	BW/FE/FW/SR
Kaiser, Virginia	Moraine Valley Community College	BW/QM/SM
Kalach, Fadi	Miami-Dade Community College, District	PS
Kaldor, Mike	Miami-Dade Community College, Wolfson Campus	FE*/PB
Kann, Annette	Miami-Dade Community College, Medical Center	FW/SU
Kann, Marlene	Miami-Dade Community College, Medical Center	FW
Kaplan, Gloria	Miami-Dade Community College, Medical Center	PB
Kaseberg, Alice	Lane Community College	SM
Kellogg, John	Miami-Dade Community College, North Campus	PB
Kelly, Mary Lou	Pensacola Junior College	QR(FM)
Kennedy, Jane	Brevard Community College	SC(FM)
Kennedy, Jere	Brevard Community College	SR(FM)
Kirst, Joyce	Bakersfield College (Kern)	QR
Kline, Jan	Miami-Dade Community College, Medical Center	PB
Klosek, Stanley	Cuyahoga Community College	PL/SR
Kolman, Helen	Miami-Dade Community College, Kendall Campus	FE (2)
Kotler, Lorne	Miami-Dade Community College, District	PS
Krnacik, Mildred	Macomb Community College	SW
Krupp, Linda	Brevard Community College	QR(FM)
Lackey, Brenda	University of Tennessee at Martin	PC/SI

LEGEND

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Name	College/University	Legend
Lake, Rich	St. Louis Community College	SR
Lamadriz, Rocio	Miami-Dade Community College, Wolfson Campus	SU
Lamazares, Ivonne	Miami-Dade Community College, North Campus	SI/SW
Lamb, Bill	Johnson County Community College	BW
Landsman, Mary	Santa Fe Community College	BW/PL
Lane, Linda	Foothill College	SR
Langan, Terry	Fox Valley Technical College	BW
Lawrence, Brad	Miami-Dade Community College, North Campus	PB
Leather, Carol	Miami-Dade Community College, Wolfson Campus	SU
Leitch, Patrick	Miami-Dade Community College, Medical Center	BW/FE/PL/SM
Leitman, Carolyn	Cuyahoga Community College	BW
LeMaster, Melanie	Edison Community College	SC(FM)
Lergenmiller, Claire	Pensacola Junior College	SR(FM)
Lescaille, Robert	Miami-Dade Community College, Kendall Campus	FE
Lester, John	Miami-Dade Community College, Wolfson Campus	SM
Lever, Judy	Miami-Dade Community College, Homestead Campus	FW/SID
Lewis, Sue	Miami-Dade Community College, Kendall Campus	FW
Liang, Kaiyang	Miami-Dade Community College, Kendall Campus	SM
Lipof, Irene	Miami-Dade Community College, Wolfson Campus	PB/SID
Long, George	Miami-Dade Community College, Kendall Campus	FE/SU
Lore, Tricia	Humber College	BW
Lorenzo, Bert	Miami-Dade Community College, North Campus	PB
Lowery, Ben	Grambling State University	PC
Loxterman, Jane	Daytona Beach Community College	IC(FM)
Lucas, Steve	Phoenix College (Maricopa)	PL/SR
Luck, Phyllis	Broward Community College	QW(FM)
Ludeke, Jerry	Bakersfield College (Kern)	PL/SC/SR
Ludovici, Elaine	Miami-Dade Community College, North Campus	SI
Lugo, Leonor	Miami-Dade Community College, Medical Center	PB
Lukenbill, Jeffrey	Miami-Dade Community College, North Campus	IC/PB
Malena, Richard	Phoenix College (Maricopa)	PL/SR
Malone, Mike	Polk Community College	SM(FM)
Marin, H	Miami-Dade Community College, North Campus	PB
Martelly, Diane	Miami-Dade Community College, Homestead Campus	FE*/FS/FW/SD
Martin, Louise	Miami-Dade Community College, Medical Center	FE (2)/FW/SU
Martin, Wayne	Miami-Dade Community College, District	PS
Martin-Hall, Judy	Indian River Community College	SE(FM)
Maspons, Maria	Miami-Dade Community College, Wolfson Campus	SU
Mass, Corey	Miami-Dade Community College, Wolfson Campus	SU
Matas, Adriana	Miami-Dade Community College, Wolfson Campus	EC
Mathews, Sarae	Miami-Dade Community College, Kendall Campus	SM/SU
Maxwell, Jack	Indian River Community College	IC(FM)
Mazzagatti, Cora	Miami-Dade Community College, Medical Center	PB

LEGEND

Software Review: **SR** - Reading; **SW** - Writing; **SM** - Math; **SE** - ESL; **SC** - Study Skills/Critical Thinking
Question Writing: **QR** - Reading; **QW** - Writing; **QM** - Math; **QC** - Coordinator

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* Organizer of a Faculty Exchange Visit

Name	College/University	Legend
Mazzagatti, Roy	Miami-Dade Community College, Kendall Campus	FE
McCool, Samuel	Miami-Dade Community College, North Campus	FE (3)/GP/QW/SI/SW/SU
McCoy, William	North Florida Community College	IC(FM)
McCranie, Sandra	Indian River Community College	QR(FM)
McDaniel, Wendy	Miami-Dade Community College, District	PS
McDonald, Jean	Miami-Dade Community College, Homestead Campus	PB/FE*
McFadden, Nancy	Fox Valley Technical College	SR
McFared, John	Miami-Dade Community College, North Campus	PB
McKeever, Benjamin	Sinclair Community College	SW
McKitterick, Tom	Miami-Dade Community College, Kendall Campus	IC/PB
McLaughlin, Jackie	Central Piedmont Community College	PL/SM
McLean, Ruth	Humber College	IC
McManus, Laurie	St. Louis Community College at Meramec	BW
Meagher, Don	Miami-Dade Community College, North Campus	BW/FE (2)/QC/QR/SR/SU
Medina, Ira	Miami-Dade Community College, North Campus	BW/SE
Medina-Cabral, Myra	Miami-Dade Community College, Medical Center	IP/SE
Meistrell, Sonja	Miami-Dade Community College, Wolfson Campus	SE
Mellan, Williams	Hillsborough Community College	IC(FM)
Mese, Jan	Miami-Dade Community College, Medical Center	PB/SR
Messier, William	Miami-Dade Community College, District	PS
Metzler, Joann	Brevard Community College	QW(FM)
Middleton, Liz	Polk Community College	QM(FM)
Miller, Dwight	Lane Community College	PL/SM
Miller-Moore, Barnette	Indian River Community College	SC(FM)
Milmed, Joyce	Miami-Dade Community College, North Campus	FE
Mitchell, Cristi	Miami-Dade Community College, Kendall Campus	FW
Mohr, Ellen	Johnson County Community College	PL/SW
Montiel, Yvonne	Gateway Community College (Maricopa)	BW
Moo, Andrew	Miami-Dade Community College, Kendall Campus	FE
Moran, Terry	Kirkwood Community College	IC
Morrell, Hector	Miami-Dade Community College, Homestead Campus	FW
Morrison, Chaplain	Miami-Dade Community College, Medical Center	FW
Moser, Don	St. Louis Community College	PL/SM
Mosley, Joe	Dallas County Community College (Richland)	SI
Muller, William	Moraine Valley Community College	QW/SW
Murray, Bertha	Tallahassee Community College	SW(FM)
Myers, Peggy	Indian River Community College	SR(FM)
Myers, Steven	Lane Community College	SM
Nation, Patricia	Miami-Dade Community College, Wolfson Campus	FW/PB/SU
Nelson, John	Lane Community College	SM
Nelson, Tanya	Miami-Dade Community College, Kendall Campus	FE/FW
Newmeister, Hillary	Bakersfield College (Kern)	QW
Nichols, Katrina	Delta College	PL/SM

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Niles, Jennifer	Miami-Dade Community College, North Campus	FE (2) / FW / SU
Novatney, Janet	Miami-Dade Community College, Kendall Campus	FW
Nwankwo, Victor	Miami-Dade Community College, District	PS
O'Brien, Barbara	Miami-Dade Community College, District	PS
O'Connell, Theresa	Miami-Dade Community College, District	PS
O'Hara, Maureen	Miami-Dade Community College, Wolfson Campus	PB / SU
Ojeda, M. Carmen	Miami-Dade Community College, District	PS
Ojeda, Maria	Miami-Dade Community College, District	PS
Opp-Beckman, Leslie	Lane Community College	SE
Orlin, Susan	Miami-Dade Community College, North Campus	FE / FW / SU / SW
Orr, Don	Miami-Dade Community College, North Campus	SI
Oseroff, Abe	Miami-Dade Community College, Kendall Campus	FE (2) / FW / PB / SI
Packer, Stephanie	Miami-Dade Community College, North Campus	SI
Page, Calvin E.	Miami-Dade Community College, Wolfson Campus	FE (3) / IP
Paige, Christine	Grambline State University	SR
Paiva, Judy	Northern Virginia Community College	BW
Palazuelos, Mary	Miami-Dade Community College, North Campus	FE / FW / QM / SM
Palow, Bill	Miami-Dade Community College, Wolfson Campus	BW / FE* / FW
Paris, Mark	Miami-Dade Community College, North Campus	LS
Parke, Dawn	Miami-Dade Community College, Homestead Campus	QM
Partlow, Lori	Indian River Community College	QW(FM)
Patterson, Bill	Foothill College	IC
Pattnaik, Suchitra	Miami-Dade Community College, District	PS
Payne, Michele	Kirkwood Community College	SW
Pelikant, Maryann	Miami-Dade Community College, North Campus	SU
Pennington, Dorothy	Tallahassee Community College	SM(FM)
Peres, Martin	Broward Community College	SM(FM)
Perez, Elena	Miami-Dade Community College, North Campus	FE / SI
Perez, Guillermo	Miami-Dade Community College, Wolfson Campus	SU
Perez, Janis	Miami-Dade Community College, Kendall Campus	SU
Perez, Maritza	Miami-Dade Community College, North Campus	FE / GP
Perez-Capote, Juan	Miami-Dade Community College, North Campus	EC / PB
Perreira, Patricia	Miami-Dade Community College, Medical Center	PB
Pieke, Martin	Humber College	SC
Pierce, Tom	South Seattle Community College	SC
Pierrt, Frantz	Miami-Dade Community College, North Campus	PB
Piga, Susan	Miami-Dade Community College, Wolfson Campus	SU
Piziali, Gail	Miami-Dade Community College, North Campus	SD / SID
Pollard, Betty	St. Louis Community College at Forest Park	BW
Pollard, Lonnie	Miami-Dade Community College, North Campus	FW / IP / SID
Pollock, Joanne	Fox Valley Technical College	BW
Pool, Rodger	Dallas County Community College District	IC / ST

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Name	College/University	Legend
Porter, David	Miami-Dade Community College, North Campus	SU
Portis, Theodore	Grambline State University	PL/SM
Powers, Flo	Indian River Community College	SW(FM)
Prague, Melinda	Miami-Dade Community College, Wolfson Campus	IP/PB/QC/QW
Press, Gail	Miami-Dade Community College, North Campus	FE/SC
Prignam, Judith	Miami-Dade Community College, North Campus	FW
Putz, Sandra	Foothill College	SM
Pyles, Carol	Miami-Dade Community College, Medical Center	PB
Quesada, Luis M.	Miami-Dade Community College, North Campus	PB
Radakovich, Dan	Johnson County Community College	ST
Raichoudary, Ram (Roy)	Miami-Dade Community College, Kendall Campus	FE/PB
Rakowsky, Christine	Cuyahoga Community College, West	SW
Rambo, Shirley	Miami-Dade Community College, North Campus	FW
Rann, Anette	Miami-Dade Community College, Medical Center	FW
Rappoport, Joel	Miami-Dade Community College, North Campus	FE/FS/SD/SM
Rasor, Leslie	Lane Community College	IC
Ray, Blair	Polk Community College	SR(FM)
Read, Garbriel	Miami-Dade Community College, North Campus	FW/GP/SI
Reed, Beatriz	Miami-Dade Community College, North Campus	FE/FW
Reeves, Mary	Miami-Dade Community College, Wolfson Campus	FW/SW
Reynolds, Jean	Polk Community College	SW(FM)
Riccio, Norma	Miami-Dade Community College, Wolfson Campus	SU
Richter, Suzanne	Miami-Dade Community College, Wolfson Campus	IC
Riley, Edward	St. Johns River Community College	IC(FM)
Riley, Kathy	Polk Community College	QR(FM)/QW(FM)
Robertson, Sharon	University of Tennessee at Martin	SC/SI
Roche, Rose Anne	Miami-Dade Community College, District	PS
Rodriguez, Jesus	Miami-Dade Community College, District	PS
Rodriguez, Ninon	Miami-Dade Community College, Medical Center	BW
Roemer, Ann	Miami-Dade Community College, Wolfson Campus	SU
Rohr, Ted	St. Louis Community College	IC
Romeo, Jean	Delta College	QM
Rose, John	Miami-Dade Community College, Kendall Campus	PB
Ross, Ken	Broward Community College	IC(FM)
Rucker, John	Moraine Valley Community College	IC
Rueda, Javier	DeAnza College	QM
Ryan, Jude	Polk Community College	QW(FM)
Rymer, Tom	Lane Community College	SM
Sak, Deborak	Monroe Community College	PL/SW
Saleh, Abed	Miami-Dade Community College, Wolfson Campus	FW
Samet, Scott	Miami-Dade Community College, District	PS
Samms, Evlette	Miami-Dade Community College, North Campus	PB
Samuels, Keith	Pensacola Junior College	IC(FM)

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Name	College/University	Legend
Sanderson, Sara Lee	Miami-Dade Community College, Kendall Campus	DT/EC/FE (3)*/IP/PB/SC
Sastre, Margarita	Miami-Dade Community College, North Campus	FE (2)/FW/SU
Schinoff, Richard	Miami-Dade Community College, Homestead Campus	FW/IC
Schmelzer, Judy	Miami-Dade Community College, Kendall Campus	FW
Schomer, Steven	Miami-Dade Community College, Medical Center	FW
Schuemann, Cynthia	Miami-Dade Community College, Wolfson Campus	FS/SC/SU
Schurger, Judith	Miami-Dade Community College, Homestead Campus	FW/SI
Schwartz, Pearl	Miami-Dade Community College, Kendall Campus	FE
Scott, David	Kern Community College District	BW/IC/ST
Seaman, Carol	Edison Community College	SM(FM)
Search, Sally	Tallahassee Community College	QM(FM)
Segall, Michaela	Miami-Dade Community College, North Campus	FE*/FW/PB/SU
Senfeld, Leonore	Miami-Dade Community College, North Campus	FE (2)
Seth, Johanna	Edison Community College	SE(FM)
Sharpton, Robert	Miami-Dade Community College, Kendall Campus	FE/SU
Shelton, Gwen	University of Tennessee at Martin	SI
Shin, Alfred	Humber College	PL/SM
Shinn, Debbie	Bakersfield Community College	QW
Shumaker, Paul	Cuyahoga Community College	IC
Sileika, Antanas	Humber College	SE
Sirkin, Howard	Broward Community College	QM(FM)
Siu, Giselle	Miami-Dade Community College, Wolfson Campus	FW/SID
Smires, Charles	Florida Community College at Jacksonville	IC(FM)
Smith, Lois V.	Miami-Dade Community College, North Campus	PB
Smith, Melvin	Miami-Dade Community College, North Campus	FE (3)/FW/GP/IP
Smittle, Pat	Santa Fe Community College	IC(FM)
Sodon, James R.	St. Louis Community College at Florissant	BW
Sorkin, Howard	Broward Community College	QM(FM)
Southard, Anne	Okaloosa-Walton Community College	SW(FM)
Spano, Carleen	Miami-Dade Community College, Medical Center	EC/IC
Spence, Leighton	Miami-Dade Community College, Homestead Campus	FE
Speranza, Angela	Miami-Dade Community College, Homestead Campus	FW
Stackelberg, Cora	Cuyahoga Community College	PL/SM
Stanley, Dorothy	Bakersfield College (Kern)	PC/SM
Stearns, Martha	Central Piedmont Community College	PC/SR
Steer, Helena	Miami-Dade Community College, Wolfson Campus	FW
Stevens-Garcia, Maria	Miami-Dade Community College, Wolfson Campus	FE/PB
Stoyanovich, Dragolyub	Miami-Dade Community College, Kendall Campus	FE
Strickland, Larry	St. Petersburg Community College	IC(FM)
Sturm, Bruce	DeAnza College	BW
Suco, Elizabeth	Miami-Dade Community College, Wolfson Campus	FE (2)/LS
Sunico, Sharon	DeAnza College	QW

LEGEND

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Susini, Sheila	Humber College	BW
Sussman, Barbara	Miami-Dade Community College, Medical Center	FE (2)/FS/FW/SC/SD/SU
Sussman, Marjorie	Miami-Dade Community College, Wolfson Campus	FE/FW/SI/SR/SU
Swan, Greg	Maricopa Community College District	IC
Symons, Jim	DeAnza College	BW/QM/SM
Szuck, Paul	Pasco-Hernando Community College	IC(FM)
Taghi-Zoghi, Karen	Miami-Dade Community College, North Campus	LS/SU
Tagle, Tessa Martinez	Miami-Dade Community College, Medical Center	PB
Talavera, Ernest	Miami-Dade Community College, Wolfson Campus	FE/SI
Tapp, William	Valencia Community College	IC(FM)
Tarber, Judy	Miami-Dade Community College, Wolfson Campus	FW
Taylor, Cheryl	Humber College	SC
Tebbs, Don	Miami-Dade Community College, Kendall Campus	BW/SU
Tennant, Jeff	Santa Fe Community College	PL/SM
Thomas, Jean	Foothill College	BW
Thomas, Linda	Miami-Dade Community College, District	PS
Thomas, Sharon	Miami-Dade Community College, Kendall Campus	FW
Thompson, Robert	Lane Community College	SM
Tillett, Bill	Miami-Dade Community College, North Campus	QW/SI/SU/SW
Tixier, Linda	Miami-Dade Community College, North Campus	PB/SI
Torrella, Rafael	Miami-Dade Community College, Wolfson Campus	PB
Torres, Carmen	Miami-Dade Community College, District	PS
Trantham, William	Florida Keys Community College	IC(FM)
Tripplett, Glenn	Okaloosa-Walton Community College	IC(FM)
Tucker, Walter	Miami-Dade Community College, North Campus	FE
Tulloch, Denton	Miami-Dade Community College, North Campus	FW/SD
Veiga, Marisella L.	Miami-Dade Community College, Homestead Campus	FW
Velilla, Angie	Miami-Dade Community College, Kendall Campus	SE
Verdieu, Lucas	Miami-Dade Community College, Wolfson Campus	FW
Verrett, Joyce	Grambling State University	IC
Vicente, Jose	Miami-Dade Community College, Wolfson Campus	EC
Vicenti, William	Kean College Of New Jersey	IC
Villamil, John	Miami-Dade Community College, Wolfson Campus	PB/SID
Villar, Maria C.	Miami-Dade Community College, Wolfson Campus	PB/SI
Walker, Daisy	Miami-Dade Community College, North Campus	SI
Walters, Jim	Phoenix College (Maricopa)	IC
Walton, Donna	Miami-Dade Community College, Medical Center	FE/FW/SW
Waluconis, Carl	Seattle Central Community College	PL/SR/SW
Wambu, Judy	Kean College of New Jersey	PL/SR
Ward, Wendy Jo	Miami-Dade Community College, Wolfson Campus	SI
Warford, Lawrence	Lane Community College	IC
Warmke-Robitaille, Julie	Santa Fe Community College	SE

LEGEND

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Warren, Lucille	Sinclair Community College	IC
Waterman, Kay	Polk Community College	QM(FM)
Weaver, Chris	Miami-Dade Community College, Medical Center	LS/SID
Webb-Petschauer, Joni	Appalachian State University	SC
Weglarz, John	Kirkwood Community College	PL/SM
Welch, George	Miami-Dade Community College, Kendall Campus	BW/EC/FE/IP/PB/PL/SW
Welch, Reina K.	Miami-Dade Community College, Wolfson Campus	DT/FW/IP/SE
West, Carolyn	Macomb Community College	SM
Whalen, Wick	Miami-Dade Community College, Kendall Campus	FW (2)
Whearty, James	Foothill College	PL/SW
Whetstone, Jr., Mike	Miami-Dade Community College, North Campus	FE
Whidden, Matrid	Edison Community College	QM(FM)
Whiteneck, Alice	Lane Community College	SC
Whiteside, Don	Miami-Dade Community College, Kendall Campus	FW
Widmer, Diane	Miami-Dade Community College, Wolfson Campus	SU
Wiegandt, Elizabeth	Miami-Dade Community College, Kendall Campus	SD/SE/SI
Wiley, Bennie	Miami-Dade Community College, Kendall Campus	PB/FE
Williams, Claude	Central Piedmont Community College	IC
Williams, Roger	Cuyahoga Community College	IC
Willig, Barbara	Miami-Dade Community College, Medical Center	BW/FE/FW/SU
Willoughby, Lois	Miami-Dade Community College, Kendall Campus	FW
Winebrenner, Larry	Miami-Dade Community College, Medical Center	SW
Winter, Deobrah	Miami-Dade Community College, Medical Center	BW/FE (2)/FW
Wirtel, Joseph	Miami-Dade Community College, North Campus	PB
Wolven, Fred	Miami-Dade Community College, Homestead Campus	FE/IP/QR/QW/SI/SR/SW
Wolverton, Lynda	Polk Community College	QR(FM)
Wong, Alice	Miami-Dade Community College, North Campus	SD
Wong, Linda	Lane Community College	BW
Woolam, Alice	Pensacola Junior College	QM(FM)
Wright, Jenna	University of Tennessee at Martin	PL/SE/SI/SW
Wyers, Lori	Fox Valley Technical College	IC
Wyman, Syma	Miami-Dade Community College, District	PS
Yeatts, Edwards	Miami-Dade Community College, North Campus	SI
Yoder, Jonathan	Northern Virginia Community College	BW
Young, Eleanor	Sinclair Community College	IC
Young, Nancy Wilson	Miami-Dade Community College, Kendall Campus	FE (2)
Zabsky, Harold	Miami-Dade Community College, Medical Center	PB
Zaldivar, Raquel	Miami-Dade Community College, Wolfson Campus	SI

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Appendix B

Software Attributes

Software Content Attributes:

Accuracy (3)
Information is current
There are no factual errors
Content is free of spelling & grammatical errors

Appropriateness (5)
Models and examples are not oversimplified
Content is free of stereotypes & social biases
It includes problem-solving situations of varying difficulty
It provides applications to real-life situations
It is not obscured by jargon or technical terms

Feedback (3)
Content provides explanation of correct answers
It provides alternate explanations
Alternate explanations aim to correct student understanding

Meeting Faculty Needs:

Ease of Implementation (6)
Documentation is provided
It presents ways the package can be used
It provides support materials
It describes how to assess student performance
Software requires minimal teacher time to get students using it
It frees up teacher time from tedious tasks

Adaptability (6)
Software gives individual attention to students as needed
It can be customized for a group of students
It can be customized for a single student
It can be used for independent study
It can be used for peer groups
It can be used for classroom presentations

Summary Information (6)
Software maintains student usage and performance records
It generates summary reports that can be viewed on screen
It generates summary reports that can be printed
It generates summary reports as an ASCII text file
Student data are stored on each student disk
Student data are stored on disk for a class of students

Meeting Student Needs:

Ease of Use (7)
On-line directions are clear, concise, and complete
On-line help is clear, concise, and complete
Student manuals are provided
They are helpful
Student workbooks are provided
They are useful
Software provides status messages to minimize confusion

Adaptability (4)
Software adjusts content based on student responses
It allows branching into different parts of the program
It adapts to the first-time versus the experienced user
It adapts to a range of reading abilities

Testing (3)
Software incorporates pre-tests
It incorporates post-tests
It allows students to leave a question unanswered & go back to it later

Tracking (2)
Software keeps students informed of progress
It provides a summary of performance & suggests what to do next

Interactivity (7)
Software actively engages the student
It provides student feedback
It is tied to the responses and thus is credible and supportive
It explains errors
It suggests corrections of errors
It forgives extraneous errors
It presents relevant practice exercises

Appropriateness (18)
Software allows students to think and solve problems
Examples are appropriate for adult learners
Animation and/or graphics are used
They focus attention on important content and process
They allow coverage of advanced concepts
They are appropriate for adult learners
Sound-effects are used
They focus attention on important content and process
They allow coverage of advanced concepts
They are appropriate for adult learners
Color is used
It focuses attention on important content and process
It allows coverage of advanced concepts
It is appropriate for adult learners
Video is used
It focuses attention on important content and process
It allows coverage of advanced concepts
It is appropriate for adult learners

Software Operations:

Reliability (3)
Software is free of programming errors
It runs with minimum delays
Extraneous input does not disrupt the program

Format (7)
Program maintains a bookmark for reentry
Program allows the student to magnify print
Voice capability is used
The right quantity is presented
It is audible
Inappropriate dialect is avoided
Screens are free of clutter and dense print

Reading Objectives

Word Learning Skills (46)

Word Recognition

Phoneme-grapheme relationships (phonics):

Vowels	W, S
Consonants	W, S
Vowel and consonant combinations	W, S
Syllabification	W, S
Emphasis (stress)	W, S
Compound words	W, S

Basic sight words:

Word configurations	W, S
Typical recognition lists (Dolch, Thorndike, et. al.)	W, S

Dictionary Skills

- Order of entries (alphabetizing)
- Guide words
- Parts of word entries
- Diacritical markings
- Selecting an appropriate definition for a word in context
- Using dictionaries with different organizational patterns
- Using the dictionary as a source of information

Context Clues for Word Meanings

Direct definition or restatement clues	S, P, G
Punctuation/typographical clues	S, P, G
Experience clues (reader's knowledge base)	S, P, G
Example clues	S, P, G
Summary clues	S, P, G
Comparison/contrast clues	S, P, G

Word Elements to Define Words

Prefixes in words	W, S, P, G
Suffixes in words	W, S, P, G
Roots in words	W, S, P, G
Combinations of prefixes, suffixes, & roots	W, S, P, G

New Words in Specialized Groupings

Occupational/technical words	W, S, P, G
Academic words from core areas	W, S, P, G
Words with multiple meanings	W, S, P, G
Words with similar sounds but different spellings & meanings	W, S, P, G

Correct Spelling

Applying phoneme/grapheme relationships	W, S
Applying knowledge of word parts	W, S
Applying basic spelling rules	W, S
Developing a personalized system for spelling improvement	W, S

Word Relationships

Antonyms	W, S, P
Synonyms	W, S, P
Homonyms	W, S, P
Part to whole/whole to part	W, S, P
Function	W, S, P
Rhyme	W, S, P
Attributes (characteristics)	W, S, P
Spelling	W, S, P
Member to class/class to member	W, S, P
Age or size	W, S, P
Cause/effect	W, S, P
Creating simple analogiesto show relationships	W, S, P
Solving analogies	W, S, P

Functional Reading (10)

- Understanding signs (enter, exit, smoking in designated areas only, etc.)
- Understanding forms (college registration, etc.)
- Understanding simple instructions (in textbooks, tests, etc.)
- Understanding information found in newspapers
- Understanding information found in restaurant menus
- Understanding information found in telephone directories
- Understanding information found on food labels
- Understanding information found on medicine labels
- Understanding information found in public transportation schedules
- Understanding information found in training manuals

Basic Comprehension (15)

Topic/Main Idea

Recognizing the stated main idea of a paragraph/passage	P, G
Recognizing the unstated main idea of a paragraph/passage	P, G
Formulating the main idea of a paragraph (topic sentence) or of a longer passage (thesis)	P, G

Details

Identifying the major details of a paragraph/passage	P, G
Identifying the minor details of a paragraph/passage	P, G

Organizational Patterns

Sequence	P, G
Cause/effect	P, G
Comparison/contrast	P, G
Definition	P, G
Example	P, G
Facts	P, G
Enumeration	P, G
Classification	P, G
Problem/solution	P, G
Mixed patterns	P, G

Transitional Expressions (9)

Sequence	S, P, G
Cause/effect	S, P, G
Comparison/contrast	S, P, G
Definition	S, P, G
Example	S, P, G
Summary	S, P, G
Enumeration	S, P, G
Problem/solution	S, P, G
Mixed patterns	S, P, G

Critical Comprehension (29)

Author's Purpose

Writing to inform or explain	S, P, G
Writing to persuade	S, P, G
Writing to elicit emotion or mood	S, P, G
Writing to entertain	S, P, G

Author's Bias

Bias by proportion (emphasis)	S, P, G

W = Word Level S = Sentence Level P = Paragraph Level G = Passage Level

- Bias by a choice of information — S, P, G
- Bias by a word choice's denotation — S, P, G
- Bias by a word choice's connotation — S, P, G
- Euphemisms — S, P, G
- Stereotyping — S, P, G
- Propaganda techniques — S, P, G

Author's Tone

- Irony — S, P, G
- Cynicism — S, P, G
- Wit and humor — S, P, G
- Sarcasm — S, P, G
- Satire — S, P, G

Making Judgments

- Differentiatng fact and opinion — S, P, G
- Drawing conclusions — S, P, G
- Making inferences — S, P, G
- Considering the author's qualifications — S, P, G
- Considering other viewpoints not expressed by the author — S, P, G
- Examining quantity and quality of evidence — S, P, G
- Challenging assumptions or analogous relationships — S, P, G

Author's Use of Figurative Language

- Simile — S, P, G
- Metaphor — S, P, G
- Allusion — S, P, G
- Personification — S, P, G
- Hyperbole and understatement — S, P, G
- Idiomatic expressions — S, P, G

Textbook/Technical Reading (18)

Reading to Study

- Relating text passages to visual/graphic materials — S, P, G
- Textbook previewing techniques — S, P, G
- Note-taking — S, P, G
- Outlining — S, P, G
- Mapping — S, P, G
- Summarizing/synthesizing — S, P, G
- Reading-to-study techniques (e.g., SQ3R) — S, P, G
- Locating specific information — S, P, G

Interpreting visual materials

- Charts — S, P, G
- Graphs — S, P, G
- Maps — S, P, G
- Tables — S, P, G
- Diagrams/illustrations — S, P, G

Reading for Tests

- Multiple-choice questions
- True/false questions
- Matching questions
- Completion questions
- Understanding key words in essay questions

Reading in Content Areas (29)

Mathematics

- Surveying the textbook — S, P, G
- Applying a reading-to-study technique — S, P, G
- Applying vocabulary/memory techniques to learn symbols and formulas — S, P, G
- Applying steps in analyzing mathematical word problems — S, P, G
- Applying skills for reading visual materials — S, P, G

Social Sciences

- Surveying the textbook — S, P, G
- Applying a reading-to-study technique — S, P, G
- Applying vocabulary/memory techniques to understand concepts & terminology — S, P, G
- Recognizing frequently used organizational patterns — S, P, G
- Applying critical comprehension skills — S, P, G
- Applying skills for reading visual materials — S, P, G

Sciences

- Surveying the textbook — S, P, G
- Applying a reading-to-study technique — S, P, G
- Applying vocabulary/memory techniques to understand symbols, formulas, concepts, and terminology — S, P, G
- Recognizing frequently used organizational patterns — S, P, G
- Applying critical comprehension skills — S, P, G
- Applying skills for reading visual materials — S, P, G

Humanities and Literature

- Surveying the textbook — S, P, G
- Applying a reading-to-study technique — S, P, G
- Applying vocabulary/memory techniques to understand concepts & terminology — S, P, G
- Recognizing frequently used organizational patterns — S, P, G
- Applying critical comprehension skills — S, P, G
- Applying skills for reading visual materials — S, P, G

Vocational/Occupational/Technical Studies

- Surveying the textbook — S, P, G
- Applying a reading-to-study technique — S, P, G
- Applying vocabulary/memory techniques to understand concepts & terminology — S, P, G
- Recognizing frequently used organizational patterns — S, P, G
- Applying critical comprehension skills — S, P, G
- Applying skills for reading visual materials — S, P, G

Rate & Flexibility (11)

Building reading rate

- Reading phrases rather than individual words — P, G
- Skimming techniques — P, G
- Scanning techniques — P, G
- Flexible reading rates — P, G
- Techniques to overcome barriers to flex. reading — P, G

Establishing a purpose for reading

Using flexible reading rates:

- Skimming techniques — P, G
- Scanning techniques — P, G

Making decisions according to purpose:

- Choosing texts according to information need — P, G
- Choosing texts according to readability level — P, G
- Choosing texts according to level of detail/generality — P,G
- Choosing texts according to author viewpoint/bias — P, G

W = Word Level S = Sentence Level P = Paragraph Level G = Passage Level

Writing Objectives

Prewiting (12)

Building Fluency
- Free writing
- Keeping a journal
- Blind writing

Generating/Organizing Information (Ideas)
- Brainstorming
- Clustering and mapping
- Questioning (using lists of questions)
- Engaging in situational writing (case studies)
- Examining developmental models (e.g., definition)
- Responding to readings
- Interviewing
- Reasoning inductively/deductively
- Using sources (appropriate databases)

Writing (25)

Limiting the Thesis
- Sentence completion
- Modeling (illustrations, examples)
- Open-ended options (illustrations used as idea starters)

Organizing/Outlining Information (Ideas)
- Experimentation with original formats/ possibilities (e.g., rhetorical modes) P,E
- Forms and graphic structures to be filled in (e.g., comparison/contrast, process, etc.) P, E
- Classifying P, E
- Establishing priorities P, E
- Clustering and mapping P, E

Composing a Draft
- **Using rhetorical modes:**
- Description P, E
- Narration P, E
- Illustration P, E
- Comparison/contrast P, E
- Cause/effect P, E
- Definition P, E
- Process analysis P, E
- Argument P, E
- Drafting topic sentences
- Drafting thesis statements
- Clarifying main points with supporting details P, E

Achieving Unity and Coherence
- Transitions S, P, E
- Key words (repetitions, echoes) S, P, E
- Synonyms S, P, E
- Antonyms S, P, E
- Subordination S, P, E
- Coordination S, P, E

Revision (12)

Reassessing Expectations
- Audience
- Purpose
- Tone

Evaluating the Draft
- **Thesis:**
- Unity
- Focus
- **Organization:**
- Coherence
- Paragraphs
- Evidence/illustration/details
- **Sentences:**
- Syntax
- Variety
- Combining
- Diction

Editing (25)

Proofreading
- Paragraphing (indenting or blocking)
- Capital letters
- Abbreviations
- Hyphenation
- End punctuation
- Internal punctuation
- Special graphics
- Apostrophes
- Spell-checking

Improving Word, Phrase, and Clause Usage
- Nouns: singular/plural; possessive forms
- Pronouns: singular/plural; possessive forms; subjective/objective case
- Verbs: mood; voice; tenses; infinitives; participles; gerunds
- Conjunctions
- Adjectives
- Articles (definite/indefinite)
- Adverbs
- Prepositions
- Spelling
- Phrases
- Dependent clauses
- Independent clauses

Improving Word Relationships
- Subject-verb agreement
- Noun-pronoun agreement
- Sequence of tenses
- Modification

S = Sentence Level P = Paragraph Level E = Essay Level

Mathematics Objectives

Base Ten Notation (8)

Reading whole numbers and writing in standard notation from zero to one trillion
Writing as a standard numeral a number named by a verbal expression
Rounding a given number to the nearest ten, hundred, or thousand
Using whole number exponents in power notation to represent products
Using whole number products to represent powers with whole number exponents
Writing standard numerals from expanded numerals
Writing expanded numerals from standard numerals
Comparing and ordering whole numbers

Basic Ops/Whole Numbers(10)

Recognizing counting or natural numbers
Recognizing whole numbers
Performing the operation of addition on the set of whole numbers
Performing the operation of subtraction on the set of whole numbers
Performing the operation of multiplication on the set of whole numbers
Performing the operation of division on the set of whole numbers
Estimating sums, differences, products, and quotients of whole numbers
Recognizing number properties
Applying rules for order of operations
Finding square roots of perfect square numbers

Prime Numbers & Factorization (4)

Determining the factors of a given number of reasonable magnitude
Determining prime factorization of numbers of reasonable magnitude
Identifying any prime number less than one hundred
Determining the least common multiple using prime factorization of two or more numbers of reasonable magnitude

Basic Ops/Positive Fractions (19)

Constructing models to represent fractions
Writing equivalent fractions
Simplifying fractions
Comparing fractions
Performing the operation of addition on the set of rational numbers using fractional numerals
Performing the operation of subtraction on the set of rational numbers using fractional numerals
Performing the operation of multiplication on the set of rational numbers using fractional numerals
Performing the operation of division on the set of rational numbers using fractional numerals
Converting mixed numerals to improper fractional numerals
Converting improper fractional numerals to mixed numerals
Performing the operation of addition on the set of rational numbers using mixed numerals
Performing the operation of subtraction on the set of rational numbers using mixed numerals
Performing the operation of multiplication on the set of rational numbers using mixed numerals
Performing the operation of division on the set of rational numbers using mixed numerals
Simplifying complex fractions
Estimating sums, differences, products, and quotients of mixed numbers
Raising fractions to positive integer powers
Finding square roots of perfect square fractions
Applying order of operations rules for fractional numerals

Basic Ops/ Positive Decimals (13)

Constructing models to represent decimal numerals
Comparing magnitude of decimal numbers
Rounding decimal numbers to an indicated place
Expressing a fractional or mixed numeral as a decimal numeral
Expressing a decimal numeral as a fractional or mixed numeral
Performing the operation of addition on the set of rational numbers using decimal numerals
Performing the operation of subtraction on the set of rational numbers using decimal numerals
Performing the operation of multiplication on the set of rational numbers using decimal numerals
Performing the operation of division on the set of rational numbers using decimal numerals
Simplifying complex fractions involving decimals
Combining rational numbers in different notations
Estimating sums, differences, products, and quotients of decimal numbers
Applying order of operations rules

Ratio and Proportions (6)

Constructing models of ratios
Writing ratios
Identifying a proportion
Solving a proportion
Identifying and writing rates including unit rates
Solving word problems using proportion

Percents (7)

Constructing models to represent percent
Expressing percent numerals as decimal numerals
Expressing decimal numerals as percent numerals
Expressing percent numerals as fractional numerals
Expressing fractional numerals as percent numerals
Solving simple percent problems
Expressing statements and questions contained in problems involving percents as number sentences or proportions and then solving the problems

Units of Measure (10)

Recognizing appropriate units of length, weight, and capacity in English System
Converting within English units of length, weight, and capacity
Recognizing appropriate units of length, mass, and capacity in metric system
Converting within metric units of length, mass, and capacity

Converting from English units of length, weight, and capacity to metric units of length, mass, and capacity and vice versa
Simplifying denominate numbers (e.g., 6 ft., 5 in.)
Performing the operation of addition on denominate numbers, i.e., numbers representing units of measure
Performing the operation of subtraction on denominate numbers, i.e., numbers representing units of measure
Performing the operation of multiplying a denominate number, i.e., a number representing a unit of measure, by a rational number
Performing the operation of dividing a denominate number, i.e., a number representing a unit of measure, by a rational number

Basic Geometry (41)

Recognizing parallel lines and their properties
Recognizing perpendicular lines and their properties
Recognizing angles and their properties
Recognizing squares and their properties
Recognizing rectangles and their properties
Recognizing parallelograms and their properties
Recognizing rhombuses and their properties
Recognizing trapezoids and their properties
Recognizing other quadrilaterals and their properties
Recognizing triangles and their properties
Recognizing right triangles and their properties
Recognizing circles and their properties
Constructing models for perimeter to derive a formula for rectangles
Constructing models for perimeter to derive a formula for squares
Constructing models for perimeter to derive a formula for triangles
Constructing models for perimeter to derive a formula for circles
Constructing models for area to derive a formula for rectangles
Constructing models for area to derive a formula for squares
Constructing models for area to derive a formula for triangles
Constructing models for area to derive a formula for trapezoids
Constructing models for area to derive a formula for rhombuses
Constructing models for area to derive a formula for parallelograms
Constructing models for area to derive a formula for circles
Distinguishing between perimeter and area
Computing perimeter of rectangles
Computing perimeter of squares
Computing perimeter of triangles
Computing perimeter of trapezoids
Computing perimeter of parallelograms
Computing perimeter of rhombuses
Computing circumference of circles
Computing area of rectangles
Computing area of squares
Computing area of triangles
Computing area of trapezoids
Computing area of parallelograms
Computing area of rhombuses
Computing volume of geometric figures
Solving applied problems involving perimeter
Solving applied problems involving area
Solving applied problems involving volume

Basic Ops/Signed Numbers (10)

Recognizing integers
Recognizing rational numbers
Constructing model signed numbers
Finding the absolute value of rational numbers
Performing the operation of addition on the set of rational numbers, including negative rational numbers
Performing the operation of subtraction on the set of rational numbers, including negative rational numbers
Performing the operation of multiplication on the set of rational numbers, including negative rational numbers
Performing the operation of division on the set of rational numbers, including negative rational numbers
Evaluating exponential expressions of signed numbers
Applying rules for order of operations on rational numbers

Real Numbers (25)

Reviewing basic arithmetic with positive real numbers, powers, roots
Reviewing order of operations with positive real numbers
Recognizing natural numbers
Recognizing whole numbers
Recognizing integers
Recognizing rational numbers
Recognizing irrational numbers
Recognizing the symbols < and > with real numbers
Recognizing absolute value of a real number
Identifying number line
Performing arithmetic with signed numbers
Using number line for definition of signed number arithmetic
Using rules for definition of signed number arithmeticic
Presenting integer exponents of real numbers
Presenting positive roots of real numbers
Evaluating expressions involving several operations
Evaluating expressions involving grouping symbols
Evaluating expressions involving exponents
Recognizing commutative property
Recognizing associative property
Recognizing distributive property
Recognizing additive identity
Recognizing additive inverse
Recognizing multiplicative identity
Recognizing multiplicative inverse

Set Notation (7)

Recognizing set notation symbol for union
Recognizing set notation symbol for intersection
Recognizing set notation symbol for complement
Finding the union of at least two sets
Finding the intersection of at least two sets
Finding the complement of a set
Drawing Venn Diagrams

Simple Linear Eq./One Variable (7)

Recognizing variables, expressions, and equations
Solving linear equations by addition - subtraction principle of equality
Solving linear equations by multiplication - division principle of equality
Solving linear equations - multi-step
Solving proportions
Solving word problems
Solving absolute value equations

Simple Linear Ineq./One Variable (6)

Recognizing inequalities
Solving inequalities
Recognizing absolute value inequalities
Solving absolute value inequalities
Graphing solutions of inequalities on a number line
Solving word problems

Integer Exponents (9)

Recognizing an integer exponent and variable base
Performing multiplication with integer exponents
Performing division with integer exponents
Simplifying expressions containing negative integer exponents
Performing powers with integer exponents
Recognizing scientific notation
Converting to scientific notation
Converting from scientific notation

Performing arithmetic operations with scientific notation

Polynomials (18)

Recognizing constants, variables, terms, and coefficients
Recognizing a monomial
Recognizing a binomial
Recognizing a trinomial
Recognizing a polynomial
Recognizing the degree of a polynomial
Recognizing the correct order to write a polynomial
Recognizing rules for exponents
Simplifying expressions containing grouping symbols
Evaluating algebraic expressions
Performing multiplication by a monomial
Performing multiplication by a binomial
Performing multiplication by a trinomial
Performing multiplication by a polynomial with more than three terms
Recognizing special product forms
Dividing a polynomial by a monomial
Dividing a polynomial by a binomial
Dividing a polynomial by a polynomial of more than two terms

Factoring (6)

Recognizing factors
Factoring by greatest common factor
Factoring the difference of squares
Factoring trinomials
Factoring the sum and difference of two cubes
Recognizing a perfect square trinomial

Graphs (21)

Recognizing a number line graph
Recognizing the Cartesian coordinate system
Recognizing quadrants
Recognizing ordered pairs
Recognizing ordered pairs by quadrant
Plotting ordered pairs
Recognizing linear equations with two variables
Finding solutions to linear equations with two variables
Graphing a linear equation using a table of values
Recognizing and/or determining x and y intercepts
Graphing a linear equation using intercepts
Recognizing the slope of a line from its equation
Recognizing the slope of a line from the graph of a linear equation
Recognizing the slope-intercept form of a linear equation
Graphing a linear equation using the slope-intercept form
Graphing linear inequalities on the Cartesian coordinate system
Graphing absolute value linear equations on the Cartesian coordinate system
Graphing quadratic equations
Graphing quadratic inequalities
Graphing systems of linear equations
Graphing systems of linear inequalities

Solving Systems of Equations (9)

Recognizing systems of linear equations
Checking solution to systems of two linear equations
Solving systems of two linear equations by graphing
Solving systems of two linear equations by addition/elimination
Solving systems of two linear equations by substitution
Solving applications of systems of two linear equations
Solving systems of two linear inequalities
Solving systems of three linear equations
Solving systems of three linear inequalities

Quadratics (9)

Recognizing the zero factor property
Recognizing the standard form of a quadratic equation
Solving a quadratic equation in factored form
Solving a quadratic equation by factoring
Solving a quadratic equation by using the quadratic formula
Solving a quadratic equation by completing the square
Solving word problems involving quadratic equations
Graphing quadratic equations
Graphing quadratic inequalities

Rational Expressions (5)

Multiplying and dividing rational expressions
Finding the LCD of two or more rational expressions
Adding and subtracting rational expressions
Simplifying complex fractions
Solving equations involving rational expressions

Rational Exponents & Radicals (9)

Converting radicals to nth roots
Converting nth roots to radicals
Performing operations with rational exponents
Simplifying radicals
Adding and subtracting radical expressions
Multiplying and dividing radical expressions
Solving equations with radicals
Recognizing complex numbers
Simplifying expressions containing complex numbers

Geometry (7)

Applying the angle complement and supplement theorems
Applying the sum of the angles of a triangle theorem
Applying theorems on congruent angles formed when parallel lines are crossed by a transversal
Using the theorem on the proportionality of sides of similar triangles to find the length of a side of a triangle
Using the Pythagorean theorem to find the missing length of one side of a right triangle
Finding the perimeters and areas of squares, rectangles, parallelograms, trapezoids, triangles, circles, and other regions made from these geometric figures
Finding the volume of prisms, cylinders, pyramids, cones, spheres, and other solids made from these three-dimensional geometric figures

ESL Objectives

READING

Word Learning (26)

Dictionary Skills

- Alphabetizing — B
- Using guide words — I
- Syllabification: stress and other — I
- Selecting an appropriate definition for a word in context — I,A
- **Determining word meanings by recognizing affixes and roots:**
  - Inflectional — B
  - Derivational (changes parts of speech) — I,A
- Understanding compund words — B
- Understanding word entry information — I,A

Context Clues:

- Punctuation/typographical (e.g., italics, commas) — I,A
- Direct definition (e.g., *that is to say*) — B,I
- Experience (based on the reader's experience) — B,I,A
- Example — B,I
- Summary — I
- Comparison/contrast (e.g., *unlike Susan, who is...*) — I,A
- Appositives — I
- Synonyms and antonyms — B,I,A
- Figurative language and euphemisms — I,A
- Relative pronouns used in definition — A

Word Relationships

- Synonyms — B,I,A
- Antonyms — B,I,A
- Homonyms — B,I,A
- Function/word forms — B,I,A
- Cause/effect (e.g., *as a result*) — I,A
- Comparison/contrast (e.g., *as sweet as sugar*) — I,A
- Analogies (e.g., *quill is to pen as door is to...*) — I,A
- Idiomatic expressions — B,I,A

Literal Comprehension (20)

Sentence Level

- Word order as clues to meaning — B,I
- Paraphrase — I,A
- Connectors (e.g., *and, or, but, however*) — B,I
- **Transition Words as Clues to Meaning:**
  - Sequence/enumeration (e.g., *before, after*) — B,I
  - Cause/effect (e.g., *as a result*) — B,I,A
  - Comparison/contrast (e.g., *still, yet, also*) — I
  - Definition (e.g., *that is*) — I
  - Example (e.g., *such as*) — B,I
  - Summary (e.g., *to conclude*) — I
  - Problem/solution (i.e., conditional sentences) — I,A

Passage Level

- Previewing/predicting through skimming — I,A
- Distinguishing topic from main idea — I,A
- Distinguishing main idea from supporting details — B,I,A
- **Identifying types of support:**
  - Details — I,A
  - Examples — I,A
  - Facts — I,A
  - Reasons — I,A
  - Anecdotes — I,A
- Scanning for specific information — B,I,A
- Recognizing pronoun references — B,I,A

Critical (Interpretive) Comprehension (18)

- Recognizing analogies/association — I,A
- Categorizing — B,I,A
- Distinguishing between fact and opinion — I,A
- Distinguishing relevant from irrelevant information — I,A
- Making inferences — B,I,A
- Drawing conclusions — B,I,A
- Predicting outcomes — B,I,A
- Recognizing the author's point of view — I,A
- Recognizing biases and stereotypes — I,A
- Evaluating the credibility of the passage — A
- Determining the validity of the author's conclusion — A
- Determining the validity of the author — A
- Examining the quantity of evidence — I
- Examining the quality of evidence — A
- **Recognizing the author's purpose:**
  - Inform/explain — I,A
  - Persuade — I,A
  - Entertain — I,A
  - Appeal to the reader's emotion — I,A

Functional Skills (21)

Study Skills

- Following directions — B,I,A
- Outlining paragraphs — B,I
- Outlining passages — I,A
- Summarizing/synthesizing — I,A
- Notetaking — I,A
- Using memory & retention techniques — B,I,A
- **Test-taking:**
  - Multiple-choice questions — B
  - True/false questions — B
  - Matching questions — B
  - Completion questions — B
  - Cloze — B

Functional Reading Skills

- **Understanding:**
  - signs — B
  - forms — B,I
  - simple instructions — B
  - food and medicine labels — B
  - public transportation schedules — B
  - telephone directories — B
  - restaurant menus — B
  - training manuals — I
  - maps — B,I
  - charts/graphs — B,I

WRITING

Words/Phrases (51)

Nouns (Form & Function)

- Singular/plural (irregular nouns) — B,I
- Count/non-count nouns — I,A
- Collective nouns — I
- Noun phrases — B,I

B=Beginning I=Intermediate A=Advanced

- Possessive nouns (punctuation) I,A
- Gerunds I,A

Pronouns (Form & Function)

- Pronoun case B,I
- Demonstrative pronouns B
- Reflexive pronouns I,A
- Impersonal *You* A
- Relative pronouns A
- Extended subjects I

Verbs (Form & Function)

- Subject-verb agreement B,I
- To be B
- Other linking verbs I,A
- Intransitive verbs I,A
- Transitive verbs and object I,A
- Ditansitive verbs and object and placement I,A
- Simple form B,I,A
- Progressive (present) B,I,A
- Progressive (past) I,A
- Progressive (future) I,A
- Perfect (present) I,A
- Perfect (past) A
- Perfect (future) A
- Perfect progressive (present) I,A
- Perfect progressive (past) A
- Perfect progressive (future) A
- Passive voice I,A
- Conditional (real and unreal) I,A
- Subjunctive A
- Causative I,A

Verb Modals (Form & Function)

- Simple modal auxiliaries or expressions B,I,A
- Compound modals A

Adjectives (Form & Function)

- Adjectives as modifiers (position and order) B,I,A
- Adjective case: comparative B,I,A
- Adjective case: superlative B,I,A
- Irregular adjectives B,I
- Articles B,I,A
- Determiners B,I

Adverbial Structures (Form & Function)

- Type B,I,A
- Position B,I,A
- Order B,I,A

Prepositions (Form & Function)

- Common prepositions in prepositional phrases B,I,A
- Verb plus prepositions (nonseparable) B,I,A
- Verb plus prepositions (separable) I,A
- Verb plus two prepositions I,A
- Idiomatic expressions B,I,A

Editing

- Using capitalization B,I
- Using correct spelling, suffixes, prefixes B,I,A
- Using conventions of Standard American English A

Sentences (41)

Writing Simple Sentences

- Affirmative/negative declarative sentences B
- **Interrogative sentences:**
  - Yes/no questions B,I
  - Informative questions (*who, what, when, where*) B
  - Informative questions (*which, whom, whose, why*) I
  - Negative questions I,A
- Imperative sentences B
- Exclamatory sentences I

Writing Compound Sentences

- Using *and, or, but* B
- Using all other coordinators & adverbial connectors I,A
- Using transitions of sequence (puntuation & function) B,I,A
- Using all other transition words (punctuation & function) I,A

Writing Complex Sentences

- Using *while, before, because, after* B,I
- Using adverb clauses I
- Using adjective clauses I,A
- Using noun clauses A
- Using reported speech A
- Using embedded clauses A
- Using tag questions A
- Writing compound-complex sentences I,A

Using Appropriate Verb Sequencing

- In compound sentences I,A
- In complex sentences A
- In compound-complex sentences A

Identifying Syntactical Units

- Clauses I,A
- Fragments I,A
- Run-on sentences I,A
- Comma splices I,A

Writing Comparative Sentences

- Using adjectives B,I,A
- Using adverbs I,A
- Using nouns A

Using Sentence Variety and Sophistication

- Infinitives after verbs I,A
- Gerunds after verbs I,A
- Gerunds after prepositions I,A
- Verbals used as modifiers A

Proofreading and Editing

- Capitalization B,I
- **Punctuation:**
  - Serial comma B,I
  - Transition comma B,I,A
  - Compound sentence comma B,I
  - Appositive comma A
  - Compound sentence semicolon I,A
- Spelling B,I,A

Paragraphs (30)

Planning and Development

- Topic sentence B,I,A
- Topic & controlling idea in a topic sentence B,I,A
- Difference between topic and title B
- **Support:**
  - Major B,I,A
  - Minor I,A
- **Conclusion:**
  - Restatement of topic sentence B,I,A
  - Restatement of major support I
- Using organization appropriate to purpose B,I,A
- Using logical organization (outlining) B,I,A

Writing sentences with lexical sophistication A
Using language appropriate to audience & purpose A

Rhetorical Modes

Writing narrative with correct chronology B,I,A
Writing description with correct spatial sequence B,I,A
Writing exposition:
Using illustrations I,A
Using examples I,A
Using definition I,A
Using comparison/contrast I,A
Using classification I,A
Using cause/effect A
Using persuasion A
Using analysis A

Proofreading and Editing

Organization B,I,A
Content I,A
Audience A
Purpose A
Tone A
Mechanics B,I,A

Essays (13)

Planning and Development

Multiparagraph composition with thesis statement A
Distinguishing topic sentence from thesis statement A
Finding & developing controlling idea of a thesis A
Outlining the essay A

Drafting

Using necessary paragraph style to produce an essay A
Writing introductory paragraphs A
Writing concluding paragraphs A

Proofreading and Editing

Unity and coherence A
Content A
Audience A
Purpose A
Tone A
Mechanics A

B=Beginning I=Intermediate A=Advanced

Study Skills/Critical Thinking Objectives

Personal Behaviors (35)

Goal Setting

Understanding goal-setting
Understanding commitment and perseverance
Identifying personal goal plans (academic, financial, occupational)
Discriminating among competing goals
Developing timelines for short- and long-range goals
Finding resources needed for goal completion
Evaluating goal accomplishment and modifying goals
Developing personal rewards for goal achievement

Values Clarification

Understanding value formation
Knowing the characteristics of a value
Understanding the impact of significant others on value formation
Analyzing life experiences (family, social, spiritual)
Recognizing value indicators
Demonstrating knowledge of the process of values clarification
Recognizing and resolving values conflicts

Self-Evaluation

Understanding the benefits of self-evaluation
Using personal strengths and other resources to enhance success
Developing self-improvement plans
Identifying additional competencies/skills needed for goal achievement
Evaluating performance/improvement
Understanding negative personal habits

Stress Management

Understanding the need for adequate sleep, nutrition, and exercise
Understanding the nature and effects of stressors
Analyzing current stressors
Comprehending appropriate and inappropriate stress-reduction techniques
Developing a stress-management plan
Evaluating stress-management skills

Time Management

Comprehending time priorities
Determining the time needed for each priority
Understanding principles of scheduling
Knowing techniques for saving time
Understanding time-wasters and how to correct them
Developing and evaluating long- and short-term schedules
Practicing time-management techniques
Establishing priorities in a daily "to-do" list

Study Behaviors (15)

Concentration/Memory

Creating the appropriate study environment
Developing the ability to concentrate:
Identifying external distractions/interference
Identifying internal distractions/interference
Applying concentration techniques
Recognizing short-term memory
Recognizing long-term memory
Introducing effective memory techniques/strategies (e.g., outlining, using the peg system, chunking/clustering)
Applying appropriate memory techniques to differing tasks

Textbook Learning

Understanding textbook study methods (e.g., SQ3R, marginal questions)

Applying textbook study techniques (e.g., surveying, constructing topical maps, highlighting, using study questions & glossaries)

Reference Skills

Knowing how to use reference materials such as the dictionary, the library, computers

Test Preparation

Organizing resources such as notes, outlines, and summaries

Analyzing review procedures (e.g., specialized terms, ideas emphasized in the text, lectures, supplementary readings)

Using resources for test preparation (e.g., previous tests, study guides, handouts, group study)

Developing personal study materials (e.g., two-way charts, flashcards, questions, mapping, information integrated from several sources)

Classroom Behaviors (26)

Listening

Applying effective listening techniques:

- Resisting distractions, staying focused, exhibiting alertness
- Finding areas of interest
- Judging content, not delivery only
- Distinguishing essential from elaborative material
- Understanding the presenter's principle of organization

Note-Taking

Knowing the purposes of note-taking

Understanding tips for note-taking (e.g., personal shorthand, discipline-specific techniques, consistency of style, signal words & phrases)

Understanding note-taking techniques (e.g./, topic/explanation or idea)

Applying note-taking techniques

Combining notes from a variety of sources (text, lecture, collateral reading, worksheets, study guides)

Test-Taking

Applying general test-taking principles:

- Preparing physically and psychologically
- Previewing the test
- Understanding the directions
- Budgeting time
- Having adequate supplies

Applying skills for objective tests:

- Multiple-choice
- True/false
- Matching
- Completion

Applying skills for objective tests:

- Short answer
- Essay

Applying techniques for improving test performance:

- Reviewing exams/tests
- Diagnosing performance
- Developing a plan for improvement
- Evaluating results
- Managing test anxiety

Critical Thinking (39)

Affective Strategies

Fostering independent thinking

Exercising fairmindedness/suspending judgment

Developing confidence in reason

Developing interpersonal skills for collaborative thinking

Developing intellectual perseverance

Thinking precisely about thinking

Becoming aware of one's own thinking process (metacognition) in order to monitor and direct it

Fundamentals of Thinking

Understanding the vocabulary of critical thinking

Distinguishing facts from opinions

Distinguishing facts from values

Distinguishing relevant from irrelevant facts

Evaluating evidence and alleged facts

Recognizing stated assumptions

Recognizing unstated assumptions

Evaluating stated and unstated assumptions

Recognizing and evaluating causal relationships

Recognizing and evaluating analogies

Noting significant similarities and differences

Recognizing contradictions

Recognizing implications and consequences

Distinguishing deductive and inductive reasoning

Identifying logical fallacies

Making plausible inferences, predictions, interpretations

Making justifiable generalizations

Understanding the significance of criteria for evaluation

Evaluating the credibility of sources of information

Understanding vagueness and ambiguity

Clarifying contextual meanings of words and phrases

Thinking Strategies

Raising and pursuing root or significant questions

Exploring issues from multiple perspectives, including one's own

Analyzing or evaluating arguments, interpretations, beliefs, or theories

Analyzing or evaluating actions or policies

Understanding problem-solving processes

Assessing problem-solving processes

Understanding decision-making processes

Assessing decision-making processes

Making interdisciplinary connections

Understanding strategies for generating new ideas

Applying knowledge/insights to various contexts or different circumstances

Appendix C

Publishers and Reviewed Software Packages *

Learning Environment 2000 for Underprepared College Students

ACT (American College Testing) 2201 North Dodge Street Post Office Box 168 Iowa City, IA 52243 Phone: (319) 337-1030	R124 W114 C082	COMPASS: Reading COMPASS: Writing Study Power
AWA Software 113 Alpine Place Post Office Box 1618 Gadsden, AL 35902 Phone: (205) 442-2117	M123 M124	Algebra Without Anxiety: An Individualized Course Basic Mathematics: A Review Course
Academic Success Press Post Office Box 25002, #132 Bradenton, FL 34206 Phone: (813) 359-2819	C060	Winning at Math
Addison Wesley Publishing Co., Inc. Consumer Software Support 1 Jacob Way Reading, MA 01867 Tollfree: (800) 552-2499 Phone: (617) 944-3700	W007 M100 M125 M127 M131	Wordbench: The Tool for People Who Write The Math Lab: Pre-, Beginning, and Intermediate Algebra Impact: Basic Mathematics Impact: Intermediate Algebra InterAct Math
All-Write 35 Franklin Street Medford, MA 02155-3916 Phone: (617) 395-4608	E027	Punctuate
American Language Academy 1401 Rockville Pike, Suite 550 Rockville, MD 20852 Tollfree: (800) 346-3469 Phone: (301) 309-1400	W097 E010 E031 E032 E033 E097 E098 E099 E100 E104 E115 E116	Grammar Mastery II, A,B,C Vocabulary Mastery II for Business Grammar Mastery II: Series A Grammar Mastery II: Series B Grammar Mastery II: Series C ALA Lab Systems Vocabulary Mastery Set A Vocabulary Mastery Set B Vocabulary Mastery Set C SentenceMaker II: Series A SentenceMaker II: Series B SentenceMaker II: Series C

* Information current as of April 1995

R-Reading, W-Writing, M-Math, E-ESL, C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline

BLS 5153 West Woodmill Drive, Suite 18 Wilmington, DE 19808 Tollfree: (800) 545-7766	R018 M011 M035 E008 E092	BLS Tutorsystems, Adult Education Reading 100 BLS 100M Tutorcourse BLS Tutor Courseware-400M Tutorcourse BLS 200G: Grammar 200 Tutorcourse BLS 300G
Brooks and Cole 511 Forest Lodge Road Pacific Grove, CA 93950-5098 Phone: (408) 373-0728	M031	Algebra Mentor
Brown Bag Software 2105 South Bascom Avenue Campbell, CA 95121 Phone: (408) 559-4545	W039	Mind Reader
Bureau of Business Practices 24 Rope Ferry Road Waterford, CT 06386 Tollfree: (800) 916-8000 Phone: (203) 442-4365	R021	SpeedReading: The Computer Course
Business Planning Systems 10 Pennsylvania Avenue Rehoboth Beach, DE 19771 Phone: (302) 227-4322	W023	ABC Writer & Scholar
C and D Computer Enterprises, Inc. 720 Midwest Club Parkway Oak Brook, IL 60521 Phone: (708) 653-3555	C041 C050	The Problem Solving Toolbox SOS-Strategies for Problem Solving
Cali, Inc. 734 East Utah Valley Drive, Suite 1-200 American Fork, UT 84003 Phone: (801) 756-1011	E113	Ellis (Marketing Kit)
Career Development 2501 SE Columbia Way, Suite 190 Vancouver, WA 98661 Tollfree: (800) 543-0998 Phone: (206) 696-3529	C010 C011 C012	Test Taking for School Success Memory Skills for School Success Managing Study Time for School Success

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Compris 1 Faneuil Hall Market Place Boston, MA 02109 Phone: (617) 742-7235	R002 W050	Critical Thinking I Report Writing
Comptens New Media 2320 Camino Vita Roble Carlsbad, CA 92009-1504 Tollfree: (800) 862-2206 Phone: (619) 929-2500	M098 M099 M137	Algebra 1: First Semester Algebra: Second Semester Algebra Made Easy
Conduit The University of Iowa 100 Oakdale Campus Iowa City, IA 52242 Tollfree: (800) 365-9774 Phone: (319) 335-4100	R012 W004 W008 M008 M010 M016	SEEN Writer's Helper Stage II SEEN Algebra Drill and Practice I,II,III First Year Algebra Part I First Year Algebra Part II
Critical Thinking Press & Software Post Office Box 448 Pacific Grove, CA 93950 Tollfree: (800) 458-4849 Phone: (408) 375-2455	C072 C073 C074 C075 C076 C077 C078	Escape from the Logic Spiders Thinkanalogy Puzzles: A1 Grades 3-6 Thinkanalogy Puzzles: B1 Grades 4-7 Thinkanalogy Puzzles: C1 Grades 7-College Mind Benders: A1 Grades 2-6 Mind Benders: B1 Grades 6-10 What's My Logic: Grades 3-College
D.C. Heath and Company 125 Spring Street Lexington, MA 02173 Tollfree: (800) 235-3565 Phone: (617) 862-6650	W026	The Computer Writing Resource Kit
DOEL Software Services Post Office Box 160637 San Antonio, TX 78280-2837	R107 W088 C032	DOEL Reading Skills Program DOEL Writing Skills Program DOEL Reading Skills
Daedalus Group, Inc. 1106 Clayton Lane 280-W Austin, TX 78723 Tollfree: (800) 879-2144 Phone: (512) 459-0637	W040 W049 W105 W111 W121	Invent: Daedalus Integrated Writing Environment (DIWE) QuickStart (Daedalus) Writer's Prologue Daedalus Integrated Writing Environment Version 4.0 Respond: Daedalus Integrated Writing Environment (DIWE)

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Davidson & Associates 19840 Pioneer Avenue Torrance, CA 90503 Tollfree: (800) 556-6141 Phone: (310) 793-0600	R007	Word Attack Levels 1-9
	R011	Spell It
	R032	Word Attack: SAT Data Disk
	R033	Word Attack: Roots & Prefixes
	R072	Speed Reader II
	R082	Read 'N Roll
	W084	Grammar Gremlins
	M026	Alge-Blaster Plus
Degem Systems, Ltd. 6220 S. Orange Blossom Trail, Suite 316 Orlando, FL 32809 Tollfree: (800) 237-3838 Phone: (407) 859-8525	M121	Everyday Mathematics
Duke University Press Post Office Box 90660 Durham, NC 27708 Phone: (919) 687-3600	W009	Prewriting
EDL Post Office Box 210726 Columbia, SC 29221 Tollfree: (800) 227-1606 Phone: (803) 781-4040	R026	Learning 100: Reading Strategies (HA 1-20)
	R027	Learning 100: Reading Strategies (EA 1-20)
	R062	Quantum
	R086	Learning 100: Reading Strategies (AA 1-20)
	R087	Learning 100: Reading Strategies (BA 1-20)
	C043	Reading Strategies
Educational Activities, Inc. Post Office Box 392 Freeport, NY 11520 Tollfree: (800) 645-3739 Phone: (516) 223-4666	R014	CORE Reading and Vocabulary Development
	R015	Functional Literacy Using Whole Language (LEA I)
	R045	Diascriptive Reading III
	R050	Fundamentals of Reading
	R053	How to Read for Everyday Living
	R079	How to Read in the Content Areas
	R112	Diascriptive Reading II
	W025	CAW: Computer Assisted Writing
	M087	Applied Problem Solving
	M088	Geometry Alive
	E034	Talk to Me
	E035	Quick Talk
	E036	Conversations
	E039	Diascriptive Language Arts Development
	E089	English Basics

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Educational Design, Inc. 345 Hudson Street New York, NY 10014 Tollfree: (800) 221-9372 Phone: (212) 255-7900	M034 E101	Algebra: Equation Solving Skills Mythes, Magic & Monsters
Educational Frontiers 132 West 21 Street New York, NY 10011 Tollfree: (800) 753-6488 Phone: (212) 675-8567	C046	Developing Critical Thinking Skills for Effective Reading
Educational Testing Services Rosedale Road Princeton, NJ 08541 Phone: (609) 921-9000	R117 R122 W113 M129 C021	GUIDES LearningPlus Reading LearningPlus Writing LearningPlus Math GUIDES - Reading and Study Skills
Educulture 689 West Schapville Road Scales Mound, IL 61075 Tollfree: (800) 553-4858 Phone: (815) 777-9697	R029 R067 W031 C083	Making the Grade Series Reading and Critical Thinking Series Practical Composition Series IV Study Skills and School Success Series
Ferranti Educational Systems, Inc. 3700 Electronics Way Lancaster, PA 17604-3040	M073	Interactive Mathematics
FinnTrade 2000 Powell Street, Suite 1200 Emeryville, CA 94608 Phone: (510) 547-2281	C042	Idegen++
Fox Valley Technical College 1825 North Bluemound Drive Appleton, WI 54913-2277 Phone: (414) 735-5683	W027	COMSKL-PC
Gessler Educational Software 55 West 13th New York, NY 10011-7958 Tollfree: (800) 456-5825 Phone: (212) 627-0099	E046	Verbcon

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Glencoe Publishers Post Office Box 543 Blacklick, OH 43044 Tollfree: (800) 334-7344 Phone: (614) 899-4409	R118 R120 R121	Beyond Words: Literature Reading Beyond Words: Science Reading Beyond Words: Social Studies Reading
H & H Publishers 1231 Kapp Drive Clearwater, FL 34625 Tollfree: (800) 366-4079 Phone: (813) 442-7760	M104 C008	Topics in Algebra Electronic Learning & Study Strategies Inventory
H & N Software Post Office Box 4067 Bricktown, NJ 08723	M057	Math Practice and Problem Solver
Harcourt Brace Jovanovich 200 Academic Way Troy, MO 63379 Tollfree: (800) 237-2665 Phone: (314) 528-1052	W003 W016 W019	The Writing Tutor HBJ Writer The Holt Writing Tutor
Harper Collins College Publishing 10 East 53 Street New York, NY 10022 Tollfeee: (800) 828-6000	W120 M138 C052	Read/Write Software II Interactive Tutorials for Mathematics Read/Write Software to Accompany McWhorter
Hartley Courseware 3451 Dunckel Road, Suite 200 Lansing, MI 48911 Tollfree: (800) 247-1380 Phone: (517) 394-8500	M021 C031 C033 C035	Integers and Equations Parts I & II Analogies College Bound Analogies Advanced Critical Reading
Holt, Rinehart & Winston 301 Commerce Street, Suite 3700 Fort Worth, TX 76102 Phone: (817) 334-7526	W006	The Process Writer
Houghton Mifflin 1900 Batavia Avenue Geneva, IL 60134 Tollfree: (800) 733-1717	W002 W116 W123 M093	Fine Lines Expressways Peer Practical English Exercises and Review Computer Tutor for Interm. Algebra: An Applied Approach

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IBM Post Office. Box 1328-W 1000 NW 51 Street Boca Raton, FL 33431 Tollfree: (800) 426-3333 Phone: (407) 443-2000	R003	Vocabulary: Level IV
	R004	Reading for Meaning: Level IV
	R005	Reading for Information: Level IV
	R111	Reading for Information: Level II
	W047	Punctuation - Level III
	M009	Algebra I: Part I
	M025	Algebra II: Part I
	M053	IBM Math Concepts Level IV
	M059	Mathematics Exploration Tool Kit
	M065	Preparing for Geometry and Algebra
	M075	Geometry Two: Proofs & Extensions
IdeaFisher Systems, Inc. 2222 Martin Street, #110 Irvine, CA 92715 Tollfree: (800) 289-4332	C079	IdeaFisher
Indiana University Learning Skills Center 316 North Jordan Avenue Bloomington, IN 47405 Phone: (812) 855-7313	C001	Test Taking
	C002	Time Management
	C003	Writing Learning Logs
	C004	Summary Writing
	C005	Using Your Psychology Textbook Effectively
	C006	Using Your Biology Textbook Effectively
	C007	Textbook Marking
	C070	Tips for College Test Taking
John C. Miller 100 Riverside Drive, #14C New York, NY 10024-3734 Phone: (212) 877-0074	M135	xySolver
Jostens Learning Center 1875 South State Street Orem, UT 84058 Tollfree: (800) 678-1412 Phone: (801) 224-6400	R017	Reading V: GED Objectives
	R023	Reading for Information: Level III
	R028	Spelling: Level III
	R070	Reading IV
	R073	Science III: GED Objectives
	R074	Social Studies III: GED Objectives
	W017	Punctuation Level IV
	W018	Combining Sentences Level IV
	M004	Math III
	M005	Algebra
	M014	Math Concepts Level IV
	M015	Math Practice Level IV
	M050	Geometry One: Foundations
	M051	IBM Personal Computer Algebra Series

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Jostens Learning Center Continued	E091 E094 E095 E096 E106	Vistas: Level 3 Vistas: Level 7 Vistas: Level 9 Vistas: Level 11 Vistas: Level 5
Kapstrom, Inc. Post Office Box 1230 Buda, TX 78610	W005	Writing is Thinking
Krell Software, Inc. Post Office Box 1252 Lakegrove, NY 11755 Tollfree: (800) 245-7355	W082	Grammar...What Big Teeth You Have!
Leep, Inc 1475 Holburne Road Mississauga, Ontario Canada L5E 2L5 Phone: (905) 271-7504	R056 W115	LEEP Spelling Program LEEP Spelling Program
Lexpertise Linguistic Software 380 South State Street, Suite 202 Salt Lake City, UT 84111	W075	PC Proof
Logicus, Inc. 908 Niagara Falls Boulevard, Suite 292 North Tonawanda, NY 14120-2060 Phone: (905) 939-8652	W101	Perfect Copy
Lotus Development Corporation 1000 Abernathy Road, Suite 1700 Atlanta, GA 30328 Tollfree: (800) 831-9679 Phone: (404) 391-0011	W074	Ami Professional
MCE Lawrence Production 1800 South 35 Street Post Office Box 458 Galesburg, MI 49053 Tollfree: (800) 421-4157 Phone: (616) 665-7075	C013 C014 C015 C016 C017 C018 C039	Test Taking Made Easy Following Directions Study Skills Study To Succeed Skills for Successful Test Taking Building Memory Skills College Life
MECC 6160 Summit Drive North Minneapolis, MN 55430-4003 Tollfree: (800) 685-6322 Phone: (612) 569-1500	R013	Oregon Trail

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

The Math Lab 10893 Leavesley Place Cupertino, CA 95014 Phone: (408) 265-5659	M001 M002 M003	Pre-Algebra/The Math Lab Beginning Algebra/The Math Lab Intermediate Algebra/The Math Lab
Maxthink, Inc. 2437 Durant Avenue Berkeley, CA 94707 Phone: (510) 540-5508	W077	Maxthink 89
McGraw-Hill Publishing Company 1221 Avenue of Americas New York, NY 10020 Tollfree: (800) 338-3987 Phone: (212) 512-2000	W041 W083 M133 C051	McGraw Hill College Version of Word Perfect Edit! Mathworks Reading and Study Skills, Forms A&B
Meeting the Challenge, Inc. 3630 Sinton Road, Suite 103 Colorado Springs, CO 80907 Tollfree: (800) 864-4264	C071	AbleAid
Merit Audio Visual Post Office Box 392-W New York, NY 10024 Tollfree: (800) 753-6488 Phone: (212) 675-8567	W124 W125 E003 E004 E005 E006 E013 E025 E026 E030 E109 C022 C023 C027 C028 C059	Diagnostic Prescriptive Grammar Writing Demons Diagnostic Prescriptive Grammar Writing Demons (5 - 8) Sensible Sentence Master Synonym, Antonym and Analogy Puzzle Series: A Conversational Demons Diagnostic Prescriptive Reading ESL Demons Synonym, Antonym and Analogy Puzzle Series: C Reading Non-Fiction Critically, Upper Grades Developing Critical Thinking Skills for Effective Reading: Set 1 Developing Critical Thinking Skills for Effective Reading: Set 2 Reading Critically for Upper Grades Reading Non-Fiction Critically, Upper Grades Reading Non-Fiction Critically
Mesa State College Post Office Box 2647 Grand Junction, CO 81502 Phone: (970) 248-1206	W010 W062	Comma Sense I 1985 Comma Sense II

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline

Microcomputer Curriculum Project Post Office Box 622 Cedar Falls, IA 50613-3593 Tollfree: (800) 552-6227	M023	Microcomputer Curriculum Project Pre-Algebra-Vols. I & II
	M027	Microcomputer Curriculum Project-Algebra I
	M030	Microcomputer Curriculum Project Algebra I-Vol 2
	M064	Pre-Algebra
	M066	Principles of Mathematics
	M090	Microcomputer Curriculum Project Geometry
	M096	Microcomputer Curriculum Project Algebra I-Vol 3
	M115	Microcomputer Curriculum Project-Algebra II
Microlytics 2 Tobey Village Office Park Pittsford, NY 14534 Phone: (716) 248-9150	W102	The Elements of Style
Milliken Publishing Co. 1100 Research Blvd. St. Louis, MO 63132-0579 Tollfree: (800) 643-0008 Phone: (314) 991-4220	R042	Comprehension Power: Level Hi-A, Lessons 1-3
	R116	Comprehension Power: Levels J, K, L
	R126	Comprehension Connection: Level D, E, F
	R130	Comprehension Connection: Level G, H, I
National Collegiate Software 6697 College Station Durham, NC 27708 Phone: (919) 684-6837	W085	Bayshore Blast
Nova Development Corporation 23801 Calabasas Road, Suite 2005 Calabasas, CA 91302 Phone: (818) 591-9600	W103	American English Writing Guide
Nova Soft 232 North Freedom Boulevard Provo, UT 84601 Tollfree: (800) 658-8567 Phone: (801) 373-3233	E002	Culturgrams
PVA Systems 7777 Fay Avenue, Suite K-312 La Jolla, CA 92037 Phone: (619) 456-0707	R119	FlashRead

* Information current as of April 1995.

R-Reading; W-Writing; M-Math; E-ESL; C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Pacific Crest Software 887 NW Grant Avenue Corvalis, OR 97330 Phone: (503) 754-1067	M107	PC Solve
Parlance Software 542 South Yorktown Tulsa, OK 74104 Phone: (918) 548-4009	W076	Parlance Grammar
Performance Software, Inc. 100 Shield Street West Hartford, CT 06110 Phone: (203) 953-4040	C064	Modeling Studies Strategies
Prentice Hall Press Route 9W Englewood Cliffs, NJ 07632 Tollfree: (800) 526-0485	W024 W033 W057 W087	Blue Pencil Authoring System College Writer Webster's New World Writer Prewriter
Professor Weissman's Software 246 Crafton Avenue Staten Island, NY 10314 Phone: (718) 698-5219	M103	Professor Weissman's Software: Algebrax
Projected Learning Programs, Inc. Post Office Box 3008 Paradise, CA 95967-3008 Tollfree: (800) 248-0757	R037 W042 W045 W048	Basic Reading Skills 101 Misused Words Proteus: The Idea Generator Punctuation Tutor
Que Software 201 West 103 Street Indianapolis, IN 46290 Tollfree: (800) 428-5331 Phone: (317) 581-3500	W022 W117 C038	Rightwriter 3.1 RightWriter for Windows, Version 5.0 Reading and Thinking IV
Queue, Inc. 338 Commerce Drive Fairfield, CT 06430 Tollfree: (800) 232-2224 Phone: (203) 335-0906	R009 R010 R020 R022 R025 R030 R031 R034	Lessons in Reading and Reasoning I Lessons in Reading and Reasoning II Practical Vocabulary Analogies I College Aptitude Reading Comprehension ADD: Adjusting Degrees of Difficulty Series 1 ADD: Adjusting Degrees of Difficulty Series 2 Reading & Critical Thinking: Literal Thinking Skills

* Information current as of April 1995

R-Reading; W-Writing; M-Math; E-ESL; C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Queue, Inc Continued	R035	Reading & Critical Thinking: Evaluative Thinking Skills
	R048	Intellectual SAT Vocabulary
	R064	Reading and Thinking III
	R065	Reading and Thinking IV
	R103	Reading for Enrichment: Main Idea
	R105	Reading for Enrichment: Finding the Facts
	R110	Intellectual PSAT/SAT Reading Comprehension
	W015	English Achievement
	W046	Persuasive Essay III
	W055	Writing Skills: Learning to Write
	W061	Writing Skills Series: Developing Writing Skills
	W066	Super Scoop
	W091	Vocabulary Series
	W092	Developing Writing Skills
	W099	Basic Composition Paragraphs Package
	W118	Practical SpellingM032 Success with Algebra Series (5 of 7 disks)
	M036	Concepts in Algebra
	M041	Success with Fraction Series
	M043	Fundamentals of Math
	M068	Special Topics in Mathematics Series
	M132	Math-Kal Algebra
	M136	Learning Math Skills
	E052	The COMPress ESL Program: A
	E053	The COMPress ESL Program: B
	E054	The COMPress ESL Program: C
	E087	Basic Comprehensive Paragraph Package
	E093	Basic English Composition
	E108	Lucky 7 Spelling Games
	E117	Learning to Write
	E118	Practical Composition I: Making Words Work
	E119	Practical Composition IV: Making Sentences Work
	C024	Life Skills Reading I
	C025	Life Skills Reading II
	C026	Reading and Critical Thinking
	C029	Analogies
	C030	Lessons in Reading and Reasoning
	C038	Reading and Thinking IV
	C080	Reading and Thinking III

* Information current as of April 1995.

R-Reading, W-Writing, M-Math, E-ESL, C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

References Software, Inc. 330 Townsend Street, Suite 123 San Francisco, CA 94107	W021	Grammatik IV
Research Design Associates, Inc. 35 Crooket Hill Road, Suite 200 Commack, NY 11725 Tollfree: (800) 654-8715 Phone: (516) 499-0053	W078 W080 W122 E090	Mark-Up: A Punctuation Tool Tanglers Sequitur: A Text Sequencing Tool Sortset
SRA Thinkware Products 155 North Wacker Drive Chicago, IL 60606 Tollfree: (800) 843-8855	M018	Computer Drill and Practice
Saunders College Publishing Public Ledger Building 620 Chestnut Street, Suite 560 Philadelphia, PA 19106 Tollfree: (800) 237-2665 Phone: (215) 238-5500	M116 M118 M120	Mathcue: Fundamentals of Math Mathcue: Solution Funder Mathcue: Basic Algebra
Scholastic, Inc. 2931 East McCarty Jefferson City, MO 65101 Tollfree: (800) 541-5513 Phone: (314) 636-5271	W037 W093 W110 M033	First Draft Bank Street Writer Writing Skills Bank: For Use with the Bank Street Writer Algebra Shop
Scott Foresman and Company 1900 East Lake Avenue Glenview, IL 60025 Tollfree: (800) 554-4411	W043	PFS: Professional Write 2.1
Simon & Schuster Post Office Box 21-0215 Montgomery, AL 36121 Tollfree: (800) 228-5937 Phone: (205) 270-8989	R092	Speed Reading Tutor IV
Skills Bank Corporation 15 Governor's Court Baltimore, MD 21244 Tollfree: (800) 451-5726	R006 W012 W068 M006 M067 C034	Skills Bank II - 100 Level Skills Bank Skills Bank II Individual Skills Bank II Skills Bank II: Mathematics Skills Bank II: Study Skills

* Information current as of April 1995

R-Reading, W-Writing, M-Math, E-ESL, C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Soft Warehouse, Inc. 3660 Waialae Avenue, Suite 304 Honolulu, HI 96816-3236 Tollfree: (808) 734-5801	M037	Derive
Softkey 450 Franklin Road, #100 Marietta, GA 30067 Tollfree: (800) 227-5609 Phone: (404) 428-0008	M017	Homework Helper Math Word Problems
Speech Communication, Inc. 4630 Campus Drive, Suite 300 Newport Beach, CA 92660 Tollfree: (800) 797-8255 Phone: (714) 671-0102	E114	Sounds American
Sunburst Communications 39 Washington Avenue Pleasantville, NY 10570 Tollfree: (800) 628-8897	M022 M047 M106	King's Rule, the J. Mathematics and Discovery Green Globs and Graphing Equations The Function Analyzer
TASL North Carolina State University Post Office Box 8202 Raleigh, NC 27695-8202 Tollfree: (800) 955-8275	W094	Editor
Taylor Associates 200-2 East 2nd Street Huntington Station, NY 11746 Tollfree: (800) 732-3758 Phone: (516) 549-3000	E059 E062 E066 E067 E080 E083	CLOZE - PLUS E (Level 5) CLOZE - PLUS H (Level 8) Reading Around Words Set G (Level 7) Reading Around Words Set H (Level 8) Comprehension Power Program Set CP-F (Level 6) Comprehension Power Program Set CP-I (Level 9)
Timeworks, Inc. 444 Lake Cook Road Deerfield, IL 60015 Phone: (708) 559-1300	R049	Evelyn Wood Dynamic Reader

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Tom Snyder Productions 80 Coolridge Hill Road Watertown, MA 02172-2817 Tollfree: (800) 342-0286 Phone: (617) 926-6000	E110	Decisions, Decisions: Foreign Policy
	E111	Decisions, Decisions: Immigration
	E112	Group Grammar
	C047	Decisions, Decisions: Environment
	C048	Decisions, Decisions: Television
	C053	Decisions, Decisions: Prejudice
	C054	Decisions, Decisions: Aid
	C055	Decisions, Decisions: Substance Abuse
	C056	Decisions, Decisions: Urbanization
	C058	Decisions, Decisions: Campaign Trail
	C062	Decisions, Decisions: Foreign Policy
Townsend Press Pavilions at Greentree Marlton, NJ 08053 Phone: (609) 772-6410	R016	Ten Steps to Improving Reading Skills
	R036	Advancing Vocabulary Skills
	R040	Building Vocabulary Series
	R055	Improving Vocabulary Skills
	R069	Ten Steps to Building College Reading Skills
	R129	Ten Steps to Advancing College Reading
True Basic Inc. 12 Commerce Avenue West Lebanon, NH 03784 Tollfree: (800) 872-2742	M007	The Algebraic Proposer
	M019	Algebra - The Kemeny/Kurtz Math Series
	M070	Arithmetic - Kemeny/Kurtz Math Series
	M071	Pre-Calculus - Kemeny/Kurtz Math Series
	M084	Algebra I Part II
Tusoft Post Office Box 9979 Berkeley, CA 94709	M020	Expert Algebra Tutor
	M039	Expert Tutor for Arithmetic
University Communications, Inc 3895 Norht Business Center Drive, #120 Tucson, AZ 85705 Tollfree: (800) 876-8257 Phone: (602) 888-3076	C066	Novanet: Study Skills Unit 3
	C067	Novanet: Directions of Reasoning
	C068	Novanet: Dictionary Skills
	C069	Novanet: Using Library References
VTAE 1 Foundation Circle Waunakee, , WI 53597 Phone: (608) 849-2424	M060	The Right Answer - Interactive Modumath (Basic Math)

* Information current as of April 1995

R-Reading; W-Writing; M-Math; E-ESL; C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Ventura Educational Systems 910 Ramona Avenue, Suite E Grover Beach, CA 93433-2154 Tollfeee: (800) 336-1022 Phone: (805) 473-7383	M091 M092	Algebra Concepts Hands-On Math
W.W. Norton and Company, Inc. 500 Fifth Avenue New York, NY 10110 Tollfree: (800) 233-4830 Phone: (212) 354-5500	W032	Norton Textra 2.0
WFB Enterprizes 1225 19th Street Beaumont, TX 77706 Phone: (409) 898-1983	C040	CASSIP
Wadsworth Publishing Company 7625 Empire Drive Florence, KY 41042 Tollfree: (800) 423-0563	W011	Organize
Weaver Instructional Systems 6161 28 Street S.E. Grand Rapids, MI 49546 Tollfree: (800) 634-8916	R001 R024 R075 W106 W107	Speed and Strategy Reading Efficiency System Reading Efficiency System Supplement 100: Reading Efficiency System English Language Instructional Systems: Grammar, Usage Reading Efficiency System
West Publishing 610 Opperman Drive St. Paul, MN 55164-0526 Phone: (612) 687-8000	C061	Reading Enhancement & Development
Wisc-Ware 1210 West Dayton Street Madison, WI 53706 Tollfree: (800) 543-3201	W060	Snowball
Writing Tools Group One Harbor Drive, Suite 11 Sausalito, CA 94965	W096	Correct Grammar

* Information current as of April 1995.

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If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Xpercom 3511 Bolivar, Apt. 310 Dallas, TX 75220 Phone: (214) 357-4660	W001	Thoughtline: The Intelligent Writer's Companion
Xpress P.S.S., Inc. 10001 Meadow Brook Drive, #100 Dallas, TX 75229 Tollfree: (800) 613-7518	W112	Xpress Yourself: Artificial Intelligence

* Information current as of April 1995

R-Reading, W-Writing, M-Math, E-ESL, C-Critical Thinking/Study Skills

If a software title is listed under a publisher more than once, then it has been reviewed in more than one discipline.

Appendix D

Applications Software Descriptions

This section includes descriptions of software packages used by Miami-Dade Community College faculty in their case studies presented on pages 28-76.

CSR
distributed by

Glencoe/McGraw-Hill
936 Eastwind Drive
Westerville, OH 43081
(614) 890-1111

CSR's Integrated Learning System (ILS) consists of curriculum software and the associated management components. The CSR Basic Skills offerings include more than 400 courses (modules) which teach individual reading, writing, and mathematics skills. The modules are organized into five levels, Level V representing college-level skills.

Each CSR module begins with a pre-test. If students pass the pre-test, they are immediately referred to the next module on the list. If students fail the pre-test, they are led into a tutorial which offers an explanation of the topic and guides them through a number of step-by-step examples. The examples are followed by a series of practice exercises in which the student is asked to furnish correct responses. Incorrect responses are met with helpful hints and suggestions. Once the practice exercises have been completed, students are given a post-test. If they pass it, they are ushered to the next module. If they fail the post-test, they are led through the same tutorial a second time. Regardless of whether the student passes or fails the post-test the second time, the student is moved to the next module. Only after all of the modules in the segment have been completed is the student allowed to go through the failed module(s) a third and final time. All of the courses are presented in color.

CSR's management components assist the faculty in designing and delivering predetermined sequence of modules to their students, keep track of the students' time on task and progress, and provide reports on individual students as well as for the class.

GUIDES
distributed by

Educational Testing Services
Princeton, NJ 08541
(609) 921-9000

GUIDES contains two programs for Writing and Reading. Written Communication Skills allows the students to access sixteen independent units on ten topics, such as planning and developing paragraphs, composition skills, and English fundamental skills (noun, pronoun, agreement, verb usage, idiomatic usage, sentence completeness, subordinate clauses/phrases, and parallel structures). All topics have diagnostic and follow-up units. Reading Study Skills consists of ten independent units covering such topics as understanding text, textbook reference skills, memory, words in context, and prefixes and suffixes. For each topic there is a diagnostic unit and a follow-up unit.

LEARNING 100
distributed by

Educational Development Laboratories
P.O. Box 210726
Columbia, SC 29221
(800) 227-1606

Designed for adult and ESL learners, Learning 100 is organized into instructional units called "cycles." A cycle of instruction is a carefully planned sequence of integrated learning activities which introduce, reinforce, and apply vocabulary and language skills, reading-comprehension skills, and writing skills. The literacy level covers 1.0 through 4.5, the ABE and Pre-GED levels cover 4.0 through 7.5, and the GED level covers7.0 through 10.5.

LEARNING PLUS
distributed by

Educational Testing Services
33 S. Delaware Avenue, #202
Yardley, PA 19067
(800) 559-PLUS

Developed for learners who need help with basic reading, writing, and mathematics skills, Learning Plus contains computer-based diagnostic tests, ongoing assessments, and individualized instructional programs in each content area. Math uses concrete models rather than drill and practice to build knowledge; it stresses estimation skills and uses such tools as number lines and bars, pattern and fraction grids, protractors, calculators, line graphing, scatterploting, bar, circle, and pictographs. Reading teaches the principles used in the reciprocal reading approach: predicting, summarizing, clarifying, and questioning; it stresses understanding the main idea, monitors reading comprehension, uses appropriate reading strategies, uses given information to infer meaning, classifies ideas in a passage in terms of their importance, determines flaws in an argument, and organizes information into graphs, charts, or diagrams. Writing takes a process approach rather than teaching discrete skills; students write with an interactive writing processor that stresses how to prewrite, plan, draft, revise, edit, and evaluate what has been written.

MARK-UP
distributed by

Research Design Associates
35 Crooked Hill Road, #200
Commack, NY 11725
(800) 654-8715

Mark-Up comes in two forms, one for the faculty and one for the student. The program provides punctuation exercises for the students that are fun and challenging. The student sees some text stripped of all punctuation and is expected to add it with a trial-and-error process. The program gives practice in applying punctuation rules and insights into what punctuation is used for. The program is divided into five levels, but the faculty can add more levels, input new texts, and edit advice pages.

MICROSOFT WORKS
distributed by

Microsoft Corporation
One Microsoft Way
Redmond, WA 988052-6399
(800) 426-9400

Some faculty members in writing start using Microsoft Works right away with their students since they are already familiar with word-processing programs. Students seem to adapt to the program quite well with only a few exceptions. During class, students write, revise, and print their essays in Microsoft Works; their proficiency in using the software seems to improve during the rest of the semester. However, there are times when some students have problems logging, writing to, or finding their files to continue with a particular writing assignment; nonetheless, most of them prefer to use the computer for their writing.

NORTON TEXTRA WRITER
distributed by

W.W. Norton and Company, Inc.
500 Fifth Avenue
New York, NY 10110
Tollfree: (800) 233-4830

As a word-processing program, Norton TEXTRA Write enables students to compose, type, edit, save, and print their documents. Norton also contains an on-line handbook that offers help in such topics as pre-writing strategies, thesis development, essay structure, pre-writing strategies, thesis development, essay structures, organization of ideas, grammar, and punctuation.

ONE STEP AT A TIME
distributed by

Heinle & Heinle
20 Park Plaza
Boston MA 02116
(617) 451-1940

One Step at a Time (Judth Garcia, MDCC) is being beta tested for publication. The software was developed for intermediate ESOL writing

students. It contains ten interactive tutorial-drill-test programs on such topics as adjectives, adverbs of frequency, controlling ideas, present and present continuous tenses, pronouns and possessive adjectives, and complete sentences.

PLATO
distributed by

The Roach Organization, Inc.
2607 Oberlin Road, Suite 100
Raleigh, NC 27608
(800) 869-2000

The PLATO curriculum is sequentially designed to reinforce skills previously learned, yet each lesson retains the ability to stand alone. This modularity allows faculty to design individual programs according to each student's needs.

The Basic Literacy program (3 - 8 grade level skills) in PLATO consists of 258 lessons in reading, 139 in writing, and 192 in mathematics. The Advanced Literacy program (9 - 12 grade level skills) consists of 82 lessons in reading, 87 in writing, and 263 in mathematics.

The PLATO Curriculum Manager allows faculty to collect information on the status of students. Reports that show the progress of students, can be printed. In addition, instructors can display all of the main modules or *Routing Activities* set up in the system to see what lessons are offered.

A Routing Activity is made up of a collection of lessons and tests. When students are registered in a course, they can be assigned to a given routing activity. When students sign on, they will be presented with a menu of options that will guide them through the lessons assigned to them.

PRACTICAL GRAMMAR
distributed by

Queue
338 Commerce Dr.
Fairfield, CT 06430
(203) 335-0906

Practical Grammar is a drill-and-practice software that contains modules in Parts of Speech I & II, Sentences, Sentence Patterns, Nouns, Pronouns, Pronouns and Antecedents, Complements of Verbs, Case of Nouns and Pronouns, Modifiers: Adjectives, Modifiers: Adverbs, Principal Parts of Verbs, and Comprehensive Grammar Review. The program contains a collection of activities for the adult and ESL students who need special instruction in writing.

QUANTUM READING STRATEGIES
distributed by

EDL
P. O. Box 210726
Columbia, SC 29221
(800) 227-1606

The Quantum Reading Series and the Reading Strategies are reading-enrichment programs that use high-interest stories to assist students in building rapid fluency in reading. Both programs build fluency while reinforcing vocabulary and comprehension skills. They include computerized tachistoscopic exercises to develop perceptual accuracy by flashing words faster or slower according to the student's responses, so a challenging rate can be constantly maintained. The fluency training has built-in checks which allow students to adjust the presentation rate within a story or from one story to another. Literal and interpretive comprehension checks are used to assess the recommended reading rate of the next story for the students.

The Quantum Reading Series covers five grade levels ranging from 10.5 through 13.5. The Reading Strategies series contains nine grade levels spanning from 1.0 through 10.5. Each grade level in both software packages can be run independently with EDL's management system, which keeps a record of students' activities that can be printed or displayed by the faculty in monitoring and advising students on their progress.

REALTIME WRITER
distributed by

Realtime Learning Systems, Inc.
2700 Connecticut Avenue, N.W.
Washington, D.C. 20008
(202) 483-1510 or (800) 832-2472

Realtime Writer is a tool for interactive group learning in a computerized classroom environment.

In its simplest use, the software controlling the computers divides the screen of each monitor into two rectangular areas called windows. A student types a message in a private (lower) window dedicated to serving just that one student. When satisfied with the message, the student presses a key to send it to the public (upper) window that appears instantly on other students' screens. There, in a scrolling dialogue, it joins messages other students have sent.

Rather than having all students talk at once on the same channel, during most sessions involving more than a handful of students, students will typically be placed into small groups and will communicate within their group on a single channel.

It is important to realize that teachers exercise decision-making in initiating discussions, and to an extent they can control the direction of that discourse. But there is also a dynamic at work with this system which makes this classroom setting very democratic. Functions are provided for teacher-managed course material presentation, for recording and printing of class conversations, and for managing class rosters.

SKILLS BANK
distributed by

Skills Bank Corporation
15 Governor's Court
Baltimore, MD 21244
Tollfree: (800) 84-SKILL

Skills Bank contains individualized instructional modules in several series: Reading (Vocabulary Building, Word Knowledge, Reading Comprehension); Language (Capitalization, Grammar and Usage, Punctuation, Spelling); Mathematics (Math Computation, Math Concepts, Word Problems, Introduction to Geometry and Algebra); Writing (Language Mechanics, Language Usage, Sentence Structure, Clear Writing and Paragraphs); Study Skills (Using Dictionaries and Books, Using References, Using Consumer Information, Using Maps, Charts, and Graphs). Series include hundreds of lessons, quizzes, pretests, and posttests to develop and then assess each student's skill level. Lessons are structured with concept tutorials, practice and reinforcement questions, thinking-skills lessons and reproducible worksheets and posttests.

WORD PERFECT
distributed by

Word Perfect Corporation
1555 Technology Way
Orm, Utah 84057-2399
(800) 451-5151

Word Perfect 6.0 for Windows is a powerful word processor. It uses Windows commands where pointing and clicking the mouse execute the commands. Faculty assignments can be loaded to the fileserver and downloaded to each student's working document. The grammar check is useful in student essay writing.

WRITER'S HELPER STAGE II
distributed by

Conduit
The University of Iowa
100 Oakdale Campus
Iowa City, 52252
(800) 365-9774

Writer's Helper Stage II is a prewriting, writing, and revising package which works with other word processors to teach the writing process. It offers nineteen prewriting and twenty revision activities ranging from routine approaches to writing innovative analyses. The prewriting tools include Find, Explore, and Organize, while revising tools include Structure, Audience, and Checks.

Writer's Helper Stage II assists students in finding an appropriate topic, provides a method of brainstorming through word-association lists, and offers several techniques in paragraph development. The faculty are allowed to modify, create, and update any of the lists to suit particular topics and individual teaching styles. Students are also allowed to export their writing to a word processor of their choice where they can continue making changes to their essays.

WRITER'S PROLOGUE
distributed by

SMP Courseware
St. Martin's Press
175 Fifth Avenue
New York, NY 10010
(800) 221-7945

As the student drafts and revises assignments in Writer's Prologue, questions are provided with expert step-by-step guidance through the drafting and revision stages of the writing assignment. The program stimulates thinking while the student masters the writing process.

Appendix E

Job Description

Software Implementation Director

The Software Implementation Director is required to provide technical and educational support for faculty on all campuses to design and implement effective strategies for integrating teaching, learning, and technology and to evaluate the outcomes.

Regarding the technical aspect, the Software Implementation Director is expected to insure that the Local Area Network (LAN) housed in each of the SYNERGY Centers is providing a conducive teaching and learning environment to faculty and students to concentrate on their task. This expectation requires selecting the appropriate hardware and establishing the LAN, taking into consideration the needs of disabled students; in consultation with faculty, acquiring the appropriate software and installing it on the LAN; implementing the necessary customization of hardware configuration and software to meet the needs of the campuses; assisting the campuses to determine their future needs and helping them to meet those needs; providing technical training for SYNERGY Center managers and tutors; minimizing network problems, technical impediments, and interruptions in the SYNERGY Centers.

Regarding the educational aspect, the Software Implementation Director is expected to offer faculty-development activities to help faculty understand the intricacies of the instructional software, determine the appropriate ways to integrate it into the curriculum, and design research studies to evaluate the outcomes. These activities include organized workshops as well as an on-going training program with individual or small groups of faculty across a semester.

The Software Implementation Director is also expected to keep up with research literature on the impact of technology and teaching/learning, design ways to collect data for faculty research, conduct an analysis of the data, provide feedback to faculty in a way to help them improve their uses of technology, and prepare research reports for dissemination.

In addition, the Software Implementation Director is expected to communicate with software publishers and negotiate with them to install their software on a pilot basis so that faculty can evaluate its quality for a semester or two with their students prior to making decisions to purchase the software.

Requirements

A strong background in using technology for instruction, conducting faculty-development activities, installing and maintaining LANs, resolving compatibility issues with operating systems, and using electronic communication. A master's degree and three or four years of experience with a combination of the technical and educational aspects of this job as described.

Preferred

Familiarity with college-prep programs in general and those at Miami-Dade Community College in particular.

Job Description

Software Implementation Assistant I

This individual will assist the collegewide Software Implementation Director in carrying out the responsibilities associated with a SYNERGY Center. Illustrative duties include (but are not limited to) ordering, installing, and maintaining hardware/software for the SYNERGY Centers; becoming sufficiently familiar with PSI and the installed instructional software to assist faculty in exploring the software; assisting in preparing materials for student and faculty orientation in the use of the SYNERGY Center; managing the day-to-day operations of the SYNERGY Center; assisting students and faculty when they use the SYNERGY Center; and collecting, compiling, and preparing data for analysis relative to the evaluation studies conducted at the SYNERGY Centers.

Requirements

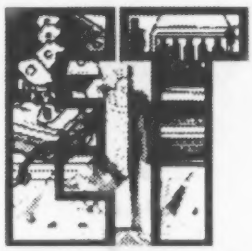
Bachelor's degree in a computer-related curriculum and two years of experience with computer labs or an equivalent combination of education and experience; and skills in interpersonal relations, communications, and teamwork.

Experience in Netware and Windows and in working with underprepared college students.

Appendix F

World Wide Web

Miami-Dade Community College is on the World Wide Web. Educational Technologies and Project SYNERGY have pages on MDCC's WWW server. The picture below is the first section of the Educational Technologies Home Page.



Educational Technologies

Welcome to the Home Page of Educational Technologies (ET)

This is a new page on the Web. We will be modifying this page continually based on future developments.

We see this as a jumping-off point for finding out about ET. The links below can lead you to information about ET's purpose, goals, history, services, software, and on-going projects. Also, we provide information about whom to contact, and how, for additional information as well as answers to your questions.

There are several ways to reach us on the WWW. Miami-Dade Community College can be accessed at `www.mdcc.edu`. There are links on the college's home page to Educational Technologies and Project SYNERGY.

The URL's for accessing Miami-Dade Community College and Educational Technologies or Project SYNERGY directly are:

Miami-Dade Community College:

`http://www.mdcc.edu`

Educational Technologies:

`http://www.mdcc.edu/edtech`

Project SYNERGY:

`http://www.mdcc.edu/synergy`

See You On The Web!

Please feel free to call Carmen Torres (305-237-2695) if you are interested in:

- Joining the Early Adopter Program for Project SYNERGY Integrator (PSI).
- Having us conduct faculty workshops on technology integration.
- Sharing with us the results of your research efforts.

We'll send you additional information.

BEST COPY AVAILABLE